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MACKENZIE VALLEY PIPELINE INQUIRY

IN THE MATTER OF AN APPLICATION BY CANADIAN ARCTIC
GAS PIPELINE LIMITED FOR A RIGHT-OF-WAY THAT MIGHT
BE GRANTED ACROSS CROWN LANDS WITHIN THE YUKON
TERRITORY AND THE NORTHWEST TERRITORIES FOR THE
PURPOSE OF THE PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

June 6, 1975.

PROCEEDINGS AT INQUIRY

VOLUME 50

CANADIAN ARCTIC
GAS STUDY LTD.

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APPEARANCES:

Mr. Ian G. Scott, Q.C.	
Mr. Stephen T. Goudge,	
Mr. Alick Ryder and	
Mr. Ian Roland	for Mackenzie Valley Pipeline Inquiry;
Mr. Pierre Genest, Q.C.	
Mr. Jack Marshall,	
Mr. Darryl Carter, and	
Mr. John Steeves	for Canadian Arctic Gas Pipeline Limited;
Mr. Reginald Gibbs, Q.C.	
Mr. Alan Hollingworth	for Foothills Pipelines Ltd.;
Mr. Russell Anthony,	
Prof. Alastair Lucas	for Canadian Arctic Resources Committee;
Mr. Glen W. Bell and	
Mr. Gerry Sutton	for Northwest Territories Indian Brotherhood and Metis Association of the Northwest Territories;
Mr. John U. Bayly	for Inuit Tapirisat of Canada and the Committee for Original Peoples' Entitlement;
Mr. Ron Veale and	
Mr. Allen Lueck	for the Council for Yukon Indians;
Mr. Carson H. Templeton	for Environment Protect- ion Board;
Mr. David Reesor	for Northwest Territories Association of Muni- cipalities
Mr. Murray Sigler	for Northwest Territories Chamber of Commerce

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V.L. Horte
Cross-Exam by Anthony

Yellowknife, N.W.T.

June 6, 1975.

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

VERNON L. HORTE, resumed:

CROSS-EXAMINATION BY MR. ANTHONY (CONTINUED):

Q Mr. Horte, ^{you recall} we left off yesterday afternoon at the point where I had quoted to you a section of the agreement in principle between the Cree and Inuit Quebec and the James Bay Development Corporation, and I read paragraph 9(g) and (h) to you revealing a policy towards the question of compensation which I can draw out of that paragraph, and I've asked you for your comments on behalf of Arctic Gas on that policy, as expressed and identified in that paragraph.

A Well, I find it very difficult to comment on a particular paragraph out of what I understand is an overall agreement. I don't know the circumstances involved in that whole agreement, what all the other considerations were, and I'm just not prepared to comment on one section of that agreement.

Q Well, obviously having the evening to discuss the matter with counsel hasn't got us very far in obtaining any information on this. Can I deal with it then just as a matter of principle, ignoring the agreement and the other terms of the agreement, but that expounds the following principle, "that the proponent of the scheme would subsidize the re-organization of traplines in order to obtain the same level of subsistence and shall pay all justified

V.L. Horte
Cross-Exam by Anthony

1 costs connected therewith, ignoring the agreement and
2 how it was negotiated and everything else, just on
3 that policy principle, what are your comments?

4 A Well, I find it very
5 difficult to comment on that particular principle.
6 I find it much easier to comment on a broader principle
7 and that being, that this pipeline, like any other
8 pipeline, I think, will be expected to pay, and
9 certainly it will be our policy to pay for damages
10 incurred, to try and restore the right-of-way and the
11 environment to as close as possible the situation it
12 was in; to the extent that we can, we would expect
13 to pay normal compensation for that type of thing, just
14 like you do anywhere else when you build a pipeline.

15 Q But the concept of the
16 subsidize of the re-organization of traplines --

17 A You're getting into a
18 detail that I don't think it's just not possible for
19 me to comment on specifically.

20 Q O.K. Let me refer you
21 then to quote another paragraph, and then I'll draw
22 out the principle of it and see if you'd be prepared
23 to comment on that. This is from the same agreement,
24 Mr. Commissioner, paragraph 13. I'll read the
25 paragraph and then pull out the policy that I'd like
26 you to comment on. Under the heading:

27 "Environmental protection,

28 The James Bay Crees and the Inuit of Quebec
29 will have representation on the Environment
30 Committee of the James Bay Energy Corporation

V.L. Horte
Cross-Exam by Anthony

1 and will be informed of all plans and
2 data relating to possible effects of the
3 hydro-electric project on the environment.
4 In addition, the native people will participate
5 in a remedial works task force to see to the
6 planning and the implementation of the most
7 effective remedial measures to be paid for
8 by the James Bay Energy Corporation. Nego-
9 tiations shall continue with a view to
10 involving the native people in the formulation
11 of environmental laws and regulations, taking
12 into account the existing procedures."

13
14 Now, would you like me to
15 break that down into its constituent elements and
16 obtain your comments, or would you have any comments
17 on the general thrust of such an arrangement?

18
19 A Well, what's your
20 specific question in connection with that?

21
22 Q O.K., the policy, as I
23 see it there, is that the native people -- and I
24 would expand that for our purposes to the question
25 of public participation -- will have representation
26 on the environmental committee of the corporation,
27 or in this case, of Arctic Gas. Now, you have an
28 Environmental Management Committee and so on, and I
29 assume you probably proceed during the construction
30 phase to have some form of environmental input in the
committee. The question then is whether, as a matter
of principle and policy, you will be prepared to allow
public participation and native participation in such

an Environmental Committee?

A Well, it would seem to me the more logical route for that public participation whether it be native participation or other participation, is really through the form of governmental agency or regulatory body that will be charged with the responsibility of seeing that we carry out the project in accordance with the conditions set down; and it would seem to me that that would be the more appropriate method for the other elements of public interest to be represented. That's what our, as I understand it, government and our democratic system is all about. I think if you start inter-mingling these things and you get some in the corporate area and also in the governmental area, you know, I have difficulty trying to sort that situation out. Now I certainly do not object to that input being provided at some level. I think more appropriately really in the governmental area.

1 Q That is really the
2 question and I want to make sure that I understand
3 your policy in this regard. We then agree about
4 the appropriateness of participation by public and
5 native organizations in the regulatory authority,
6 am I correct --

7 A I really think that parti-
8 cipation input to a great extent comes about during
9 the very processes that we are in at the present time,
10 not only this hearing, hearings before the National
11 Energy Board and others so that the outcome of those
12 hearings will be such that they will fundamentally
13 set down the basis and terms and conditions upon
14 which one would proceed. If we are in a situation
15 after being granted a permit where we still don't
16 know what the procedures will be with respect to
17 constructing the pipeline, these have got to be
18 fairly well defined in my opinion, otherwise it will
19 be impossible to finance the pipeline and construct
20 it. In other words, if we have a continuing process
21 going on through the construction period itself,
22 I don't think we will get it built.

23 Q Well, I am dealing now
24 with the situation of a continuing regulatory review
25 procedure which you suggest should be one agency
26 and I am trying to find out whether you are in
27 agreement with the concept of public participation
28 and Native participation in that regulatory tribunal.

29 A Well, I would think
30 that that agency as an arm of the government would

V.L. Horte
Cross-Exam by Anthony

1 try and set itself up to have the best expertise
2 possible in connection with carrying out
3 their public interests responsibility. To the
4 extent that that involves native people in certain
5 aspects of it, then I would think that that is
6 exactly what they would do. They are charged with
7 that responsibility, it seems to me, the Government,
8 and I think they have to go about that in the
9 best way they know how and I would be very surprised
10 in fact if they didn't take into consideration the
11 native input that could be brought to bear.

12 Q Well, I agree with you
13 Mr. Horte, that the ultimate decision is theirs. I
14 am merely trying to get your viewpoint and the
15 viewpoint of Arctic Gas as a matter of policy and
16 I am suggesting, I am asking you whether as a matter
17 of Arctic Gas policy you feel this would be an
18 appropriate and proper way of operating the continuing
19 review mechanism that we have been discussing for the
20 last two days.

21 A Well, I -- I think I --
22 MR. MARSHALL: Well, he --
23 he has answered that I think, Mr. Commissioner.

24 THE COMMISSIONER: Yes, I
25 think he has, Mr. Anthony. He doesn't agree with the
26 arrangements established in the agreement in principle
27 at James Bay.

28 MR. ANTHONY: Yes, I have
29 that -- Mr. Commissioner, I am trying to direct my
30 mind to two points. We have the regulatory authority

V.L. Horte
Cross-Exam by Anthony

1 and we have the environmental committee within the
2 -- within Arctic Gas itself or the environmental
3 input within Arctic Gas itself and I am separating
4 the two for purposes of obtaining a viewpoint
5 of policy and I am really asking two questions,
6 one, whether the question of Native and public
7 participation within the regulatory authority is
8 a policy that would be supported by Arctic Gas, and
9 secondly whether the idea of native and public partici-
10 pation within Arctic Gas's own type of arrangement
11 was satisfactory. As I understand it, he has stated
12 that within Arctic Gas would not be a satisfactory
13 type of participation and that is what James Bay
14 provides, and I have that answer and I am now dealing
15 with the question of whether in Arctic Gas' point of
16 view that sort of participation is proper within
17 the regulatory authority.

18 THE COMMISSIONER: I see,
19 well, go ahead then. You understand where we are
20 at now, Mr. Horte?

21 A Yes, and I think I
22 tried to answer that as well, sir. I said that that
23 authority is charged with the responsibility to all
24 of the people in Canada and therefore with the
25 responsibility of getting the best advice and
26 input that it can, to the extent that that includes
27 the input from the natives of the north, I am
28 sure that that would be something that they would
29 undertake. But again I would like to come back to --
30 because I think maybe we are at cross purposes here.

V.L. Horte
Cross-Exam by Anthony

1 I think that most of this input, frankly, has got to
2 be obtained in the first instance before we proceed
3 with the project so that when we start to proceed
4 we know what we are doing and we are now not trying
5 to make decisions whether we go ahead or whether
6 we don't go ahead. Now, so I think really what
7 you are talking about from an effective standpoint
8 has to take place during the process in which we
9 decide on the terms and conditions, etc. under which
10 this pipeline will be built -- not during its construc-
11 tion to the same extent.

12 Q During the course of
13 construction and operation I imagine that there will
14 be a process of design review and procedure review
15 as you have more and more experience with dealing
16 in a novel situation with very difficult terrain,
17 do you agree with that?

18 A Well, certainly there will
19 be some. We think we -- we think we have, really
20 a pretty good knowledge of the problems that we are
21 going to run into and how to handle the individual
22 situations, not necessarily where they -- precisely
23 where they are going to occur at this point in time,
24 but the design parameters, etc., upon which we know
25 how to handle the situation.

V.L. Horte
Cross-Exam by Anthony

1 So you know, I don't see any
2 great new developments that are going to take place
3 that are going to change those basic parameters of
4 design under those varying situations that we know
5 will exist along the route of the pipeline.

6 Q Your policy is, though,
7 that this sort of input should come in before the
8 regulatory approval is granted, is that correct?

9 A To a large extent, yes.
10 Definitely.

11 Q But many of the questions
12 of remedial measures, contingency plans and so on are
13 really not going to be resolved until after you have
14 your regulatory approval.

15 A Well, we're going to
16 lay out every one of them in terms of remedial
17 measures for every situation we can anticipate, and
18 I think we can anticipate most of them. Now, that
19 doesn't mean that there isn't going to have to be
20 modifications made in some of those as we learn from
21 the actual experience on the pipeline itself.

22 Q Well, in your view then
23 should the contingency plans in these operations and
24 repair manuals that we've heard about, be available and
25 reviewed and discussed in public prior to regulatory
26 approval?

27 A When you're talking about
the specific detailed construction procedures and
design plans, I'm somewhat hesitant, in that I think
we've tried to lay out here basically what we intend

V.L. Horte
CrossExam by Anthony

1 to do, and how we intend to go about it, you know,
2 then we are going to have to put together specific
3 instructions, etc., in connection with the carrying
4 out of those plans and intentions that we've set forth
5 in these public hearings, and somebody is going to
6 have to make sure that we conform to our intentions
7 in this regard.

8 Q Well, the intentions
9 are clear and are probably presented here, but
10 usually in the matter of alternatives or the type of
11 danger you're trying to avoid, I'm wondering how do
12 you anticipate the review of measures that you propose
13 at this stage merely in general terms and in alternative
14 terms?

15 A Well, I think we've tried
16 to lay them out, including the alternatives. I think
17 this Inquiry, as I understand it, intends to go into
18 this at a later phase, that is the specific terms
19 and conditions that they think -- that this Inquiry
20 thinks should be attached and certainly we will be
21 responding to those conditions and we'll go through,
22 I think, the same procedure, maybe even in greater
23 depth, in the engineering areas for sure, with the
24 National Energy Board, and I'm sure they will come
25 out with many specific terms and conditions which we
26 will have to live with with respect to design. That's
27 -- I think these things will be laid out in fairly
28 specifically but still broadly enough that there will
29 be some flexibility.

30 MR. MARSHALL:
I think, sir, this

V.L. Horte
Cross-Exam by Anthony

1 will go to argument later in the proceedings.

2 MR. ANTHONY: I'm sure it
3 will. I think, though, that we are making some progress
4 in getting an understanding of Mr. Horte's view of
5 input and public review, and I'd like to perhaps
6 pursue it at least one degree further.

7 Q Do I understand that it
8 is the intention of Arctic Gas to prepare these
9 contingency plans -- dealing now with a specific
10 example of contingency plans of repair, of remedial
11 measures, methanol spills and so on.

12 A Very definitely.

13 Q Now would these contin-
14 gency plans be prepared and be presented before this
15 Inquiry?

16 A I think we have presented
17 them.

18 Q Sorry. Do I understand
19 then that the information we now have is the extent
20 of the contingency planning that's been done?

21 A I think we've tried to
22 anticipate those contingency plans; to the extent that
23 we haven't, or somebody has some other ideas with
24 respect to them, we're certainly prepared to listen
25 and respond.

26 Q But surely you're going
27 to be preparing more detailed contingency plans and
28 instructions for your field personnel on how to deal
29 with particular problems in environmental situations.

30 A Yes.

V.L. Horte
Cross-Exam by Anthony'

1 Q And are these going to be
2 presented to this Inquiry?

3 A I don't think so, sir.
4 I think those would come after.

5 Q And they'll be coming
6 after regulatory approval, will they not?

7 A Yes, when we know all
8 the terms and conditions. That's the only time we
9 can really set down these things specifically.

10 Q And so if we wish to
11 have public comment and consideration of those con-
12 tingency plans, they have to come in after regulatory
13 approval then, do they not?

14 A They can be discussed
15 all the way through this regulatory approval. What
16 do you have in mind that we haven't covered?

17 Q Well, let's deal with
18 it as a matter of policy, since that's what you're
19 here to discuss, and I'm putting the point to you
20 that your contingency plans will not be available un-
21 til after regulatory approval, and I'm suggesting to
22 you then is it not therefore necessary to have some
23 public review or discussion of those plans after
24 regulatory approval?

25 A Well, I would think that
26 ~~they~~ they would certainly be, in granting the permit to the
27 extent that they weren't explicit, the permit would
28 be granted upon the basis that those specific plans
29 were reviewed with that regulatory authority before we
30 proceeded with construction.

V.L. Horte
Cross-Exam by Anthony

1 are what
2 Those/our contingency plans are, what we intend to do,
3 to
4 now/the extent that those plans are going to be in-
5 corporated either into regulations, they will certainly
6 be incorporated into our own internal regulations, to
7 the extent that they are incorporated into terms and
8 conditions or regulations by the regulatory body, or
9 are varied for that purpose, then we're going to have
10 to take that into account. My understanding of this
11 process is that that's what we're going through now.
12 Is to try and determine whether the plans that
13 we've put forward are realistic, are challenged, should
14 be changed, etc., and then we be so instructed.

V.L. Horte
Cross-Exam by Anthony

1 Q I think we can wind
2 this up then, can we not, by coming down to the
3 point that the contingency plan, the detailed manuals
4 which you have now said will not be available
5 until after regulatory approval, would still have to
6 be reviewed at that time --

7 A I think they will have
8 to be reviewed -- frankly, if you want my opinion as
9 to whether those have to be reviewed again in the
10 public hearing, I just don't think we will build
11 the project. I don't think that we would ever come
12 to an end.

13 Q Are you saying that
14 you wouldn't build the project if there was a public
15 hearing or public review of your contingency plans?

16 A Well, if you had to
17 go through the process again, and any modifications
18 and drawing up new ones and then review that again,
19 I don't know where you stop, but at some point somebody
20 has to say, "that we are prepared to live with the
21 terms and conditions that have been set down and the
22 review process of a responsible governmental
23 agency," and if we have to go back and say, "that agency
24 we don't believe is responsible and therefore we have
25 to hold another public hearing or more public hearings,"
26 I don't know where the process ends and I don't think
27 we will be building a pipeline under those circumstances.
28 I can't say it more honestly or specifically than
29 that.

30 Q But you have no objection

V.L. Horte
Cross-Exam by Anthony

1 to a public input into that regulatory review?

2 A What are we going through
3 today?

4 Q Well, you may be right,
5 but I am still dealing with a specific question,
6 we now, I think have come to the point of agreement
7 that the regulatory authority should properly review
8 the contingency plans following regulatory approval.

9 A I am sure they will.
10 They are a responsible body. If they don't, they are
11 not carrying out their responsibility.

12 Q I agree with you. Now,
13 will we do the further question, now, this review of
14 your contingency planning. We are not talking about
15 public hearings. We are ^{merely} talking about public input
16 into that regulatory authority and we are going back
17 to the very first question we started at, and that is
18 as a matter of policy do you feel there should be
19 public and native participation and review of those
20 contingency plans as part of that regulatory authority?

21 A To the extent that those
22 take place during the course of this hearing, the
23 hearings before the National Energy Board and before
24 approvals are obtained, yes -- After approvals are
25 obtained I think that you have to rely on the regulatory
26 authority to carry out that responsibility.

27 Q So following approval
28 you want to have the industry and the regulatory
29 authority dealing with the reviews.

30 A Absolutely.

V.L. Horte
Cross-Exam by Anthony

1 Q Thank you. Now, Mr.

2 Horte, you will be, on behalf of Arctic Gas,
3 I assume, negotiating construction contracts
4 for the construction of this pipeline project?

5 A Well, I will have a
6 responsibility, yes.

7 Q Well, does Arctic Gas
8 intend to enter into construction contracts with
9 a bonus for early completion -- is this the normal
10 and anticipated type of contract?

11 A I don't know exactly
12 what we will. That is an area frankly that we
13 are looking at now, trying to decide what is the
14 best form of contract to enter into. You know the
15 situation in construction in the north is somewhat
16 different than what you would do in the south
17 where normally you invite bids and -- on a particular
18 segment of the pipeline, on what we call a turn key
19 bid, and you turn it over to the contractor and
20 he has to build it within the estimate that he
21 has made. In the situation in the North, I very
22 much doubt that we will go for that type of bidding
23 on the major contracts themselves, it will be
24 some sort of a contract where there will be
25 costs plus a fee to the contractor for carrying out
26 the particular contract that he has.

27 Now, whether that contract
28 will contain bonuses for meeting targets, whether
29 it will contain dis-incentives if they don't meet
30 their targets, I don't know. That's -- at this point

V.L. Horte
Cross-Exam by Anthony

1 in time. that is an area that we are reviewing very
2 carefully at the present time to see how we can
3 best accomplish the objectives of an efficient
4 job, a low cost job and yet make sure that it is
5 being done in a very proper manner having regard
6 to the environmental, sociological and other
7 considerations.

8 Q Well, given your
9 projected timetables, as I gather from the evidence
10 over the last little while, you will be letting
11 these contracts rather soon. When --

12 A No we won't --

13 Q When would expect to
14 be --

15 A We certainly won't be
16 letting any contracts with respect to construction
17 until after we have approvals.

18 Q Another aspect of
19 the contract negotiation question, and that is
20 would you anticipate having to compensate contractors
21 for shut down time as a result of particular
22 environmental problems?

23 A Well, if we go the
24 cost plus route I think that automatically does it.

25 Q Perhaps we could end
26 this morning's discussion, at least from my part,
27 with some general comments and obtaining your considered
28 opinion as an expert pipeliner, if I can use that
29 phrase, and I am going to put a situation to you
30 for
and ask/your opinion as an expert involved in route

V.L. Horte
Cross-Exam by Anthony

1 selection and the question of locating a
2 pipeline.

3 A I am no expert in
4 route selection and locating a pipeline -- I know
5 what it is all about, but I am not an expert locator.

6 Q Fine, but you were
7 responsible for deciding and locating the Arctic
8 Gas line.

9 A Well, I certainly reviewed
10 the plans, etc., associated with it, but I don't hold
11 myself out as being any expert with respect to
12 locating a pipeline.

13 Q Well, perhaps there is
14 no expert as such, but ^I might perhaps confine it in this
15 way, on the basis of consultants and reports that
16 you had, you were ultimately responsible for the
17 selection of the Arctic Gas route, were you not?

18 A Yes.
19 The management of Canadian Arctic Gas was responsible.

20 Q Now, I would like
21 you to assume for purposes of illustration then, a
22 situation where along, and I will give you a specific
23 to perhaps make it a little more meaningful. Assuming
24 that along the east side of the Mackenzie there was
25 an all weather highway, and secondly a full
26 communications system. Now, you would agree with me,
27 would you that both of these systems are of great
28 assistance to the construction of a pipeline route
29 and are rather expensive to construction to put in
30 place.

1 A Yes.

2 Q And would it be your
3 opinion as a person responsible for selecting
4 a pipeline route, that given those factors, that unless
5 there were compelling reasons to go in another area,
6 that you would most likely select that route as a
7 route for a pipeline.

8 A Unless there were other
9 compelling reasons -- yes, I --

10 Q It would be the
11 first area that you would look at, would you not?

12 A I would think that they
13 would be very compelling reasons.

14 Q And similarly, if you
15 had available to you detailed terrain classification
16 of that route, that would be another factor that
17 would weigh heavily on your mind to go on that
18 particular location for a pipeline.

19 A Well, certainly the
20 terrain considerations are very important in locating
21 of a pipeline. I don't think that I have to explain
22 that.

23 Q Yes, but the mere fact
24 that there is that body of knowledge available to
25 you greatly assists you in determining the pipeline route?

26 A Yes, sir.

27 Q And in fact you use
28 D.P.W. drilling information and so on as assistance
29 in the locating of this line?

30 A Sir, that is what we

1 spent millions of dollars doing.

2 Q Yes, but you also
3 used pre-existing drill hole data available to
4 you and found that of assistance to supplement
5 the work you have done.

6 A We used all the data
7 we could possibly lay our hands on.

8 Q Right. Okay, I
9 agree. Now, in the particular case here, of the
10 selection of this line, you had the highway on the
11 east side as a fixed and given, that is correct,
12 is it not?

13 A Yes.

14 Q So you had at least that
15 component that you could consider and weigh in
16 determining whether you would go on the east of
17 the west side or any other location for a highway --
18 for a pipeline route.

19 A It was one of the factors,
20 yes.

21 Q Did you know the --
22 at the time this route was selected, did you have
23 any information on the probable or likely route of
24 an oil pipeline?

25 A Yes.

26 Q Where did your information
27 indicate the oil pipeline would be located?

28 A On the east side of the
29 Mackenzie.

30 Q And what -- and did you

V.L. Horte
Cross-Exam by Anthony

1 have maps or how did you get this information?

2 A Well, the Mackenzie
3 Valley -- I am trying to think of the name of the
4 study group -- the Mackenzie Valley Oil Study
5 Group at least --

6 MR. MARSHALL: Sir, I hate
7 to interrupt my friend, but I have the feeling this
8 is yesterday and the day before and three weeks
9 before that and six weeks before that and again
10 and again and again we have had the same things from
11 this witness and many others. Are we gaining
12 anything?

13 MR. ANTHONY: Well, I am
14 happy, Mr. Commissioner, but I am sorry if I am
15 treading on an area that has. I did not think
16 that Mr. Horte as a matter of policy had ever discussed
17 the question of the location of the oil line,
18 what information he had about it, how it weighed on
19 his decision, etc., and the question of route selec-
20 tion.

21 THE COMMISSIONER: I don't
22 think that he has discussed that specific matter so
23 I think you can pursue it.

24 A . Well, it was a --
25 well, I don't know how specific that line really was
26 located -- not too specifically, because they certainly
27 hadn't done the kind of work that is required in
28 my opinion to really specifically locate a line,
29 but the general location they had done, we were
30 aware of that. Now,
I don't think the location of the
oil line really had much bearing on the location of the
gas line other than the guidelines were talking
a corridor.

V.L. Horte
Cross-Exam by Anthony

1 on the other side, even though it presented more
2 difficult engineering or environmental problems.
3 I can't answer your question any better than that,
4 I'm afraid, sir.

5 Q Did you have any
6 indication --

7 A But I think that the
8 east side is the best place, and frankly I think it's
9 the best place for all three of those things.

10 Q Have you had any dis-
11 cussions, current discussions with the Beaufort Delta oil
12 project?

13 A No, not any specific
14 discussions. I personally have had none other than
15 what I read in the newspapers.

16 Q So you don't know what
17 the current plans are by this group for construction of
18 a hot oil pipeline?

19 A I do not. No, I do not.
20 I'd be very surprised if they wouldn't carry on from
21 the previous studies of the Mackenzie Valley Oil
22 Pipeline, all that work that was done. But I have
23 no specific knowledge of that.

24 Q Do you have any
25 knowledge with respect to the question of a hot oil
26 pipeline across from Alaska to the Mackenzie corridor?

27 A No sir.

28 Q So you have no indication
29 as to whether such is planned, or where such is
30 planned.

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Cross-Exam by Anthony

1 A I do not.

2 MR. ANTHONY: I have no further
3 questions. Thank you, Mr. Commissioner, and Mr. Horte.

4 MR. MARSHALL: Mr. Commissioner,
5 if it's convenient, at this time perhaps I could
6 respond to certain undertakings that have been given.

7 I've had some copies made of
8 certain of the charts and so on that I'll be referring
9 to and we'll have these available for counsel, and
10 I'll provide Miss Hutchinson with copies of them.

11 The transcript reference
12 5720, pertaining to the request for the additional
13 working space required for looping, in preparation of
14 the diagram for that. A diagram has been prepared by
15 Mr. Williams and as I say, we'll distribute this.

16 I should point out, sir, that
17 Mr. Dau, when he was asked during the course of his
18 cross-examination, for an estimate as to the addi-
19 tional width of right-of-way that would be required
20 in the event that looping were undertaken, gave an
21 off-the-cuff estimate of about 20 feet. In response
22 to the request that a diagram be prepared, N.E.S.
23 checked on this further and they reviewed the N.E.B.
24 regulations which cover this point, and those regula-
25 tions specify a minimum separation of 30 feet. In
26 light of the work that's been done in this review
27 and in preparation of the diagram, N.E.S. have concluded
28 that an additional 35 feet of right-of-way would be
29 required in the event looping of the proposed line
30 was carried out. The diagram that's been prepared,

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1 then, sir, shows that additional 35 feet.

2 At page 5721 of the trans-
3 cript there was a request made for a graph of the
4 labor requirements north of 60 for initial construction.
5 Mr. Williams has had a graph prepared. You will recall
6 the one that was in earlier was for the total project,
7 and this is just for north of 60.

8 I should point out, sir, that
9 this is based on the most likely schedule that was
10 described by Mr. Dau in his evidence and construction
11 panel, that is '78-79 start.

12 Next, there was a request at
13 page 5924 of the transcript for a graph dealing with
14 three things, the approximate number of manpower
15 required firstly to complete initial compressor
16 stations required for a throughput of 4.5 B.C.F. per
17 day; secondly to loop the line from Travaillant
18 Lake junction to 60 degrees north latitude in three
19 successive construction seasons; and thirdly, to
20 complete additional compressor station horsepower
21 installation required for throughput of 9.0 B.C.F.
22 per day. Such a graph has been prepared and will
23 be distributed and filed with Miss Hutchinson.

24 I should point out, sir, that
25 this assumes a very rapid buildup with looping being
26 undertaken over three years, the winters of '84,-85,
27 '85-86, and '86-'87, with additional horsepower being
28 added over the following four years. There was also
29 a request for a table of the locations that crews
30 would be working at to complete the schedule that's

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1 out in the graph that will be filed, and such a table
2 has been prepared by Northern Engineering.

3 Next, at the transcript
4 5924 there was a request to set out in a table the
5 major equipment requirements for a typical northern
6 compressor station construction crew. Also there
7 was a request for a table of major equipment requirement
8 for a typical pipeline installation spread, north of
9 60. Those tables have been prepared, sir. I under-
10 stand the major equipment requirements for the
11 typical pipeline installation spread would apply both
12 to the initial construction, and as well in the event
13 looping were undertaken, the spreads would be the
14 same insofar as the equipment requirements are
15 concerned.

16 At transcript reference
17 3851 there was a request to provide information as
18 to which manufacturer's pipe was used in the Battele
19 test. I'm advised, sir, that three pipe manufacturers
20 supplied pipe, Nippon Steel Corporation, Nippon Kokan,
21 that's K-O-K-A-N, and the Steel Company of Canada.
22 In the various tests that were conducted, first was
23 February 2nd, 1974, the pipe manufacturer was Nippon
24 Steel Corporation. July 27th, 1974, again the pipe
25 was supplied by Nippon Steel Corporation. February
26 1st, 1975, the east section was provided by Nippon
27 Kokan, and the west by Stelco. On October 24th, 1974
28 the pipe for the test was supplied by Nippon Kokan,
29 and on October 25th, 1974, pipe was supplied by Nippon
30 Steel Corporation.

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1 At 3934 there is a request
2 for a list of chemicals, fuels and lubricants to be
3 used at compressor stations. The estimates of these
4 requirements, sir, are set out in a letter from Mr.
5 Carlson, who is a member of the O. & M. panel, to
6 me dated May 15th, and I have copies of that available.

7 There were requests made at
8 3951 and 4145 of the transcript to check the theory
9 of the computer program used for emissions calculations
10 to see if it provided for low wind velocities
11 with inversion conditions. I am instructed, sir, that
12 the theory is not applicable at wind speeds below
13 approximately one meter per second, and N.E.S. is
14 conducting additional studies to investigate the effects
15 of turbine emissions during these conditions.

16 At 3944 of the transcript
17 a request was made to provide the noise levels at
18 station MO-3 which has double refrigeration. A
19 table showing those noise levels has been prepared,
20 sir. We have also available for distribution table
21 7.5.1 from the preliminary station design report
22 which shows the revised noise levels of a 30,000
23 horsepower station with single refrigeration. I
24 should note, sir, that the revised noise levels in
25 this table are slightly different from those shown in
26 the application because of slight changes in the
27 sound power level data for the electrical generators.

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1 At 4046 a request for infor-
2 mation was made, I believe by Mr. Bayly, as to whether
3 or not the effect of surcharging under reinforcing
4 bands were studied at any of the test sites. The
5 answer is no.

6 At 4140, the design panel
7 was asked to verify the 20 grains of H_2S per 100 cubic
8 feet. It's approximately equal to 860 milligrams of
9 SO_2 per cubic meter, and the 20 grains of H_2S per
10 100 cubic feet is approximately equal to 370 parts
11 per million SO_2 . N.E.S. has checked these numbers
12 and has found that 20 grains of H_2S per 100 standard
13 cubic feet does equal 860 milligrams of SO_2 per
14 cubic meter, but does not equal 370 parts per million
15 SO_2 . The correct figure is 317 parts per million
16 rather than 370 parts per million shown in the
17 transcript. Perhaps the transcript has an error in it.

18 At 4143 there is a request
19 that we provide the input parameters for the emissions
20 calculations. We have prepared, sir, a set of
21 data showing the primary exhaust components, sulphur
22 dioxide content, the oxides of nitrogen content, and
23 the turbine stack data. This emission data is based
24 on one manufacturer's data for each type of equipment.
25 N.E.S. is presently expanding its studies to consider
26 other manufacturers' data as it becomes available.

27 At 4583 of the transcript
28 there was a request to provide information as to whether
29 or not double-jointing would be done in the winter or
30 the summer. It will be done in both.

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1 At 4743 there was a request
2 to provide data as to any alternate camp which might
3 be used near Tuktoyaktuk.

4 THE COMMISSIONER: As to what?

5 MR. MARSHALL: As to an
6 alternate camp which might be used near Tuktoyaktuk.
7 I'm instructed, sir, that none is contemplated by
8 Arctic Gas for the cross-delta route near this
9 location.

10 At 4747 there is a request
11 to ascertain if dredging would be required in the
12 cross-delta alternative, and when it would be per-
13 formed. I am instructed, sir, that Shallow Bay will
14 be dredged, with dredging taking place after the
15 beluga whales have left. The information available to
16 Arctic Gas is that date is on or about the middle to
17 the end of July. Other crossings will be dredged
18 between breakup and freezeup.

19 At 4750 we were asked how
20 many men would be involved in the construction of the
21 Shallow Bay crossing. The answer is approximately 150.

22 At 4843 there was a request
23 for information as to whether or not literature surveys
24 on effects of snow removal from ice-covered lakes on
25 the North Slope had been carried out. We did give
26 an answer previously on the record, sir. We checked
27 further with the ichthyologist consulting to N.E.S. and
28 he advises that he has not been able to locate any
29 specific literature on the matter of the effect of
30 snow removal from lakes on ice cover.

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At 4961 Mr. Williams was asked to check to see if the size of the survey crews had been correctly stated at 20, and we have checked and that's correct.

At 5054 we were asked for information as to the instrumentation planned for air strips. I am advised, sir, that the present plan is that air strips will be equipped as follows for construction: A non-directional beacon, a portable visual omni-range distance measuring device, a lighted wind sock, a rotating beacon, and temporary air strip lighting.

At 5393 we were asked to provide information at the stage of preparation of the aircraft usage report. I am advised, sir, that the report is scheduled to be available in July.

We were asked, sir, at 5433 in the transcript as to the decibel level that would be associated with purging of the line. I am informed by Mr. Carlson that purging of the line at startup would involve the venting of air at approximately 50 p.s.i. for a 20-mile section. Noise at the blow-off valve would be approximately 100 to 110 D.B.A., which would be somewhat like a jet engine, and ear plugs would have to be worn for someone standing by the valve. At 100 yards from the vent the noise level would be approximately 50 D.B.A., which would be a low level not unlike normal city traffic noise, and at this level the compressor station would be able to operate within city limits

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1 and not violate the usual type of noise by-law.

2 At 3415 there was a request
3 to provide information as to the dates that the E.P.R.,
4 that's the Esso Production Research and the Battele-
5 Brooker computer programs first became available to the
6 project. The E.P.R. program was first available
7 March 13, 1973. We have no precise information as
8 to the date the second program became available.
9 The best information is that it would have been
10 available to Canadian Arctic Gas sometime in the
11 spring of 1972.

12 The question was asked by
13 Mr. Scott as well, as to how many of the test sites
14 -- at how many of the test sites did CAGSL have data
15 for ground temperatures prior to the introduction
16 of those two programs. I am informed, sir, that
17 the date of operations of these test facilities commenced
18 as follows: Sans Sault, March 20, 1971; Norman Wells,
19 August 4, 1971; Prudhoe Bay, they've given two dates,
20 sir, for hydrostatic, July 14, 1971, and long-term
21 25 degree Fahrenheit, July 21, 1971; and the Calgary
22 test-site, March 20, 1974. Data began to be collected
23 at those dates.

24 At transcript reference
25 3100, a request was made to provide the location of
26 the 1974 test holes in the channel at the proposed
27 crossing of the Mackenzie River at Swimming Point.
28 Reference was to Fort Simpson alignment sheets and
29 design drawings, page 1-A-0232-1001. The information
30 requested is summarized in a report, "geotechnical

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1 data report on proposed Arctic Gas Pipeline, major
2 river crossings drilling program by R.M. Hardy &
3 Associates Limited dated June, 1974. The report
4 has been made available, sir. If anyone is interested
5 in the specific pages, I can provide them with the
6 references^{at} which they can find that information.

7
8 Finally, sir, there was a
9 request made to Arctic Gas to provide a summary of
10 thermistor installations installed during the Arctic
11 Gas project. Those locations are summarized in a
12 memo from Mr. Sid Lee at Northern Engineering to
13 Dr. Clark dated 21st of April 1975. Copies of that
14 memorandum are available.

15 Thank you, sir. That completes
16 the undertakings that we were able to respond to at
17 the present time.

18 THE COMMISSIONER: Well,
19 thank you very much, Mr. Marshall.

20 MR. SCOTT: Mr. Commissioner,
21 in Volume 39 of the transcript, page 5167, when Mr.
22 Dau of the construction panel was being examined, I
23 asked Mr. Marshall if he could produce for me the
24 contractor's reports upon which Mr. Dau said he
25 replied exclusively in determining the number of
26 miles that could be done on each of the spreads, in
27 the particular seasons. I asked him for those, and
28 it was explained by Mr. Dau that those would be, as
29 he recalled, extremely voluminous, and I'm anxious to
30 have them as soon as possible because if they are to
31 be of any use it will take some time to analyze them.

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1 You will recall that Mr. Dau
2 said that he had these reports, he took the most
3 conservative ones and that forms the basis for the
4 schedule that he put before you.

5 MR. MARSHALL; On that point,
6 sir, I can provide some information. To begin with,
7 I think my friend maybe misunderstood Mr. Dau.
8 My recollection of his evidence is that the schedule
9 was developed by Northern Engineering Services on the
10 basis of its best judgment, having regard to all of
11 the various factors that it considered. Now the
12 reference that he's made to reports from contractors,
13 Northern Engineering Services, as I understand it,
14 sir, was in touch with contractors for cost estimates
15 of certain sections of the line, and there have not
16 been reports as such from contractors dealing with the
17 schedule or productivity, or estimates of non-
18 productivity. What certain contractors were requested
19 to do and did do was provide Northern Engineering
20 Services with letters attached to which were cost
21 estimates for construction of various segments of
22 line, and these then were used by Northern Engineering
23 Services in the development of its capital cost
24 estimates.

1 MR. SCOTT: Well, Mr.

2 Commissioner, respectfully, while that may be the
3 fact, it is entirely inconsistent with Mr. Dau's
4 evidence on which everything depends. You will recall,
5 and I have the references, that Mr. Dau said that the
6 scheduling was of central importance and he
7 agreed with us when we said that it was important
8 because if it were impossible to keep up with the
9 schedule there would be a natural human tendency
10 to let other matters of concern, such as environmental
11 matters, slide in favour of necessity in completing
12 according to schedule and we asked him at some length
13 how he prepared the schedule and at page 5163 through
14 to the end, I think of my cross-examination, he made
15 it perfectly clear in the following way. At page
16 5163:

17 "The procedure we used in developing
18 a construction schedule was and it's been
19 going on for a long time, was that Northern
20 developed a plan, several plans to
21 construct a project. We retained pipeline
22 contractors to provide us with information
23 with respect to the size of crews,
24 quantities of equipment, some cost in-
25 formation and advice on the season. I
26 think there eight contractors"

27 And a word that I can't read in my copy, but I
28 suppose it is:

29 "...retained for this assessment. They
30 were given certain segments to assess for

1 us and I think in all cases, more than
2 one section. We got a relatively
3 wide range of opinion, I think, with
4 respect to costs. There were obviously
5 different opinions with respect to the
6 size of the crews and the amount of
7 equipment and the amount of fuel that
8 was used and so forth. In doing their
9 assessment they visited ^{the} work site,
10 I seemed to remember that we arranged
11 summer trips over the sections that were
12 involved and we also arranged a winter
13 trip. I believe in most instances this
14 was by helicopter. We got all this
15 information and made adjustments in
16 the plan that we had developed based
17 on the information we got from
18 the contractors. Some of the con-
19 tractors were more optimistic, some
20 were pessimistic, the plan we have
21 is a synthesis of the whole program."

22 And then going on more particularly at page 5165,

23 Question:

24 "And in order to assist you to devise the number
25 of spreads you have retained eight or ten con-
26 tractors who have given you advice?

27 Answer:

28 "Yes."

29 And then on the following page, 5166, Mr. Dau describes
30 again the process they used ending at line 23 with this

1 expression:

2 "The information that we got from
3 the contractors more related to the
4 equipment that was required, labour
5 that was required and the advice as
6 to how many miles they could do in
7 a particular winter season."

8 Question:

9 "And you gave each of them a segment or two
10 to deal with?

11 Answer:

12 "As I recall they all got more than one
13 segment to look at.

14 Mr. Scott:

15 "Mr. Commissioner, I'll be asking
16 Mr. Marshall in due course to produce
17 those reports from the advisors."

18 Now, the point of it is that if there are no such
19 reports, there are no such reports, but it seems
20 to me that on the question of scheduling, Mr.
21 Dau's evidence is of no utility if he says it was
22 based on reports and those -- and there are no
23 such reports. I don't know then how he made the
24 schedule. It is a fundamental change in position.

25 MR. MARSHALL: Mr. Scott,
26 it may be a semantic problem, as I have indicated --
27 my instructions are these, the contractors provided
28 letters dealing with the cost -- their cost estimates
29 for the vari^{ous} segments of the line that they had
30 been asked to prepare bids on, and that material is

1 the possession of Northern Engineering Services.
2 They did receive such information. Now, they
3 did in the course of receiving this receive some
4 information from some of the contractors as to
5 such matters as productivity. Some of this
6 was verbal, some of it would be comments in a
7 letter, that sort of thing.

8 I don't know whether
9 I can add more than that. Essentially the
10 exercise was used in the development of the
11 capital costs for the construction of the project.

12 MR. SCOTT: Well, Mr.
13 Commissioner, I am not concerned at this stage,
14 though I am sure that the applicant is, about
15 the costs. I am concerned about the advice
16 they received as to how many miles they could
17 do in a particular winter season and those are
18 Mr. Dau's words, because everything depends on that
19 -- if the schedule is wrong, Mr. Dau has spelt out
20 out the consequences. He said to us that in order
21 to prepare the schedule -- he didn't say that it
22 was prepared by them, he said they retained eight or
23 ten contractors to give them this advice. Now,
24 none of those contractors were on the panel, of
25 course. We were unable to cross-examine to determine
26 whether their estimates were conservative or not.
27 Now, is it possible for my friend to give us in some
28 form the advice that they received from the
29 contractors and who the contractors were.

30 MR. MARSHALL: I think,

1 Mr. Scott, we can give you some of that information.
2 I have asked Northern Engineering if they could
3 assemble any information they got from the
4 contractors, whether it was in these letters
5 that they received with the cost estimates or
6 verbally that they have recollection of,
7 pertaining specifically to productivity
8 estimates. If there are other aspects that you are
9 interested in as well, I am sure that they could
10 dig through the letters and the cost estimates
11 to see if any such information^{is there} or they
12 may have it in some other form.

13 MR. SCOTT: Well, in addition
14 to that, Mr. Commissioner, I would like to know
15 for the record who determined how many miles
16 could be done in a particular winter season. Mr.
17 Dau was asked if he did that, if N.E.S. did that,
18 he said, "No, we got estimates from other people and
19 took the most conservative." If other people did it,
20 I'd like to know who they are. If instead it
21 turns out that Mr. Dau was wrong and N.E.S. did it,
22 we may have to have them back because I would like
23 to know how they did it.

24 MR. MARSHALL: Mr. Scott,
25 with respect to that last comment, I would like a
26 specific reference if you could give it to me
27 from the transcript where Mr. Dau said that others
28 developed the estimates. My clear understanding
29 of his evidence was that N.E.S. developed the
30 estimates as to how many miles could be done by a

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1 spread.

2 MR. SCOTT: It is at page
3 5166 where Mr. Dau says,

4 "The information we got from the contractors...."
5 He has already referred to the eight or ten, and
6 he has already said that in some cases they averaged
7 them and in some cases they chose the most conservative,
8 he said:

9 "The information we got from the contractors
10 is more related to the equipment that
11 was required, the labour that was required
12 and the advice as to how many miles they
13 could do in a particular winter season."

14 MR. MARSHALL: Well, that
15 is quite a different thing, in my submission,
16 Mr. Commissioner, from saying that the various
17 contractors set production, set the schedule. It is
18 perhaps a matter of emphasis, but it seemed to me
19 that the evidence was pretty clear that Mr. Dau and
20 the engineers working under his overall direction
21 at Northern Engineering Services were responsible
22 for making these estimates and they made those
23 estimates.

24 Now, they did go through an
25 exercise of going to contractors and asking them
26 to develop bids on the basis of those estimates and
27 that was useful information that they got from
28 them, there is no question about that, but Mr. Dau
29 accepted the responsibility for the development
30 of the construction schedule and he so testified.

1 MR. SCOTT: Well, Mr.
2 Commissioner, I don't want to prolong it, and if
3 my friend is saying that Mr. Dau's evidence was
4 ^{and} mistaken, that is one thing/that can be accepted
5 and we can live with that, but you will recall, I
6 think, and you will have to read the whole six
7 or seven pages from 5162 to 5171. Mr. Dau explaining
8 that he got these estimates from eight or ten
9 contractors and there was a long debate as to whether
10 he averaged their estimates in cases where they
11 both estimated on the same spread or whether
12 he took the most conservative of these estimates
13 and he finally came down by saying that basically
14 he took the most conservative of the
15 estimates.

16 Now, explicit in that entire
17 exchange, was the fact that this estimating was done
18 by somebody else and he relied on it. We weren't
19 able to cross-examine those persons and didn't
20 complain about that. We simply asked for the
21 reports.

22 Now, as I understand --
23 THE COMMISSIONER: The
24 estimates --

25 MR. SCOTT: Their estimates
26 and who they were. If I understand my friend he
27 is now saying that they didn't do that at all, in
28 fact it was done by somebody in N.E.S. Well, if it
29 was, in due course we want to know who did it
30 and how it was done.

1 THE COMMISSIONER: Well,
2 Mr. Marshall, as I understand him is saying that
3 these estimates were obtained from the contractors
4 and Mr. Dau and his colleagues used their own judgment
5 based on the estimates as to how much production
6 they would get in terms of mileage on each spread
7 each winter.

8 MR. SCOTT: Well, is it not
9 possible to provide the estimates as to the number
10 of miles that could be done that were provided by
11 the contractors? I am sure that even if it was
12 given orally there was somebody in N.E.S. who, when it
13 was given, made a note of it.

14 MR. MARSHALL: I think that
15 we could check that, Mr. Scott and we can provide
16 you with any estimates that were given by the
17 various contractors that N.E.S. spoke to as
18 to the productivity that they felt could be achieved
19 by spreads working north of 60. We can dig up
20 that information. Now, as I say, the cost estimates
21 may not be the source, but I think they could
22 dig through that material and others that they have
23 in their files that they used in the preparation
24 of schedules and we could provide you with a
25 statement setting out the various inputs
26 they got from the contractors in these specific
27 subjects; so really I am inviting Mr. Scott
28 to list those specific items that you are interested
29 in and we will have N.E.S. run through the
30 files and see what they can come up with from these

1 various contractors and also any recollections they
2 have got as to verbal discussions.

3 MR. SCOTT: I am not prepared
4 to list, at the moment all I can do is to say that
5 at the page to which I have referred, Mr. Dau has
6 referred to information he got from eight or ten
7 contractors on a variety of matters including
8 advice as to how many miles could be done in a
9 particular winter season. I would like the note
10 or the evidence of that information and the names
11 of the contractors who provided it.

12 THE COMMISSIONER: Well,
13 that should be possible, shouldn't it?

14 MR. MARSHALL: Certainly,
15 sir. I foresee no difficulty there.

16 MR. SCOTT: Why wasn't it
17 done?

18 THE COMMISSIONER: Well --
19 why don't you ignore that comment, Mr. Marshall.

20 MR. MARSHALL: It is
21 FRiday, sir.

22 THE COMMISSIONER: I was
23 going to say that since we won't be sitting again
24 in a formal hearing until well into July, I take it ,
25 Mr. Scott, that you would want Mr. Marshall to send --
26 I am not being facetious -- to send that to you in
27 the mail.

28 MR. SCOTT: If it is conven-
29 ient.

30 MR. HOLLINGWORTH: I would

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1 like to receive that information too.

2 THE COMMISSIONER: Well,
3 send it to all the participants, Mr. Marshall,
4 if you don't mind.

5 MR. MARSHALL: Yes, sir.
6 Sir, there is perhaps one other point that I should
7 comment on before Mr. Veale begins his cross-
8 examination. And this relates to a discussion on
9 May 20th, I believe. You will recall, sir,
10 I believe it was you that asked a question as to
11 El Paso's position on the potential effects of a
12 chilled pipeline operated at buried river crossings.
13 Mr. Hollingworth said that he could obtain some
14 information he thought and would attempt to do so, and
15 he stated after lunch that day that he had had a
16 discussion with Dr. Harlan of Northern Engineering,
17 and Mr. Hollingworth reported the results of
18 this conversation and he stated, "El Paso has
19 decided that frost bulbs won't be a problem
20 since at river crossings the pipeline is going to be
21 coated with six inches of concrete which will provide
22 effective insulation and there won't be a frost
23 bulb problem."

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1 I have spoken with Dr. Har-
2 lan , sir, and he advises me that Mr. Hollingworth
3 has accurately reported the conversation that they
4 had, and I've mentioned this to Mr. Hollingworth.
5 There is no question as to the accuracy of that
6 statement. That's not to suggest at all, however,
7 that Dr. Harlan agrees with the statement made by
8 El Paso and we don't wish to infer that coating pipe
9 with six inches of concrete is going to be a solution
10 to the frost bulb problem situation described.

11 MR. HOLLINGWORTH: Well, I
12 certainly hope I didn't imply by my comments that
13 the applicant was perhaps accepting El Paso's views
14 on that, and I certainly hope I didn't imply that
15 my client is accepting that view either.

16 THE COMMISSIONER: There's
17 one other matter relating to our schedule. After
18 today the next sitting of the Inquiry will be on
19 Tuesday, June 24th in Fort Franklin, then on Thursday
20 June 26th at Fort Norman, then Monday, July 7th at
21 Fort McPherson, and Thursday, July 10th at Old Crow ,
22 then Monday, July 14th at Wrigly, Wednesday, July
23 16th at Fort Liard. I think Miss Hutchinson has
24 given you all copies of this.

25 I understand there's some
26 objection, for reasons I can well understand, to
27 sitting on Friday, July 18th and Saturday, July 19th,
28 here in Yellowknife, for purposes of recommencing
29 our formal hearings, so we won't recommence our
30 formal hearings until Monday, July 21st at the usual

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1 time, one o'clock.

2 You might just, between now
3 and the conclusion of the coffee break, consider
4 whether you would be willing to sit six days, the
5 week of July 21st, that is from Monday through
6 Saturday, and you might during coffee or after coffee
7 give me your views about that, and you might also give
8 me your views as to whether you want to sit on the
9 week of July 28th to hold a formal hearing during
10 that week. If we did do that, it might well be on the
11 basis that we would go six days the week of the 21st
12 and then perhaps only three days of the week of the
13 28th, and we would try to work a little harder
14 during those nine days so that we would make as much
15 headway as we would if we were to go a full two
16 weeks.

17 What I'm really trying to
18 do is to make sure we get the equivalent of two weeks
19 of formal hearings in July, and still get a little
20 time off, for myself at any rate, the very last --
21 and for the Court reporters and Miss Hutchinson and
22 our friends from the C.B.C. -- during that last
23 week. So think about that and we can maybe work some-
24 thing out before we leave today.

25 Well --

26 MR. SCOTT: Mr. Commissioner,
27 could -
28 / I just make one other observation, as we're going
29 to consider this matter over the coffee break? If
30 we sit a six-day week in July, in the week of July
21st, the proposal that is mooted is that we should

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1 sit over Sunday, that is stay here on Sunday and
2 begin on Monday the 28th and go for three days. That
3 will give us nine days. The objection that people have
4 quite naturally to coming back for the 18th and the
5 19th is that they would then come back for two days
6 and have to sit around, pleasant as it is in Yellow-
7 knife, on Sunday and not begin to work until Monday.
8 But it seems to me either alternative poses precisely
9 the same problem, that you have one day, namely
10 Sunday, when there is no work to do, and I wonder if
11 really it would not convenience those who have to go
12 to the community hearings at Wrigley and Liard, if
13 we gave some consideration to sitting the 18th and
14 the 19th, and then the week of the 21st for six
15 days. That would be precisely the same as beginning
16 on the 21st of July, sitting over the Sunday, the
17 27th, and beginning on the 28th, except in the latter
18 alternative we get one more day at the expense of
19 the vacation for the staff.

20 THE COMMISSIONER: Well, give
21 it some thought over coffee. I think we're all trying
22 to work this out in an amicable way. Maybe we should
23 stop now for coffee. Is there any coffee? Well, let's
24 adjourn for a few minutes and just think about this.

25 (PROCEEDINGS ADJOURNED FOR FEW MINUTES)
26
27
28
29
30

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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. ANTHONY: Mr. Commissioner, perhaps before Mr. Veale commences, I would like to file as an exhibit the agreement in principle -- the James Bay Agreement, you recall it was discussed and we didn't have a copy.

THE COMMISSIONER: Yes, it will be marked.

(JAMES BAY AGREEMENT MARKED EXHIBIT 148)

MR. VEALE: Mr. Commissioner, before I begin, I would just like to do some housekeeping, as I don't get over that often these days.

In the construction panel I had asked certain questions of Mr. Dau and Mr. Williams relating to construction spread camps and the applicant undertook to provide further information on spread camp at Komakuk Beach and the spread camp at Old Crow, as well as various other camps for the other participants. Now I have received a fold-out of man months of a labor force at the spread camp near Old Crow, and what I am proposing now, I would also like to receive similar information on Komakuk Beach. There has also been some more information this morning, and I would be very interested in asking a few more questions of Mr. Williams or Mr. Dau. Now I'm not proposing to do that at this time, but perhaps if Mr. Williams will be coming over to Whitehorse, that would be an appropriate opportunity to do that.

MR. MARSHALL: Mr. Veale,

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1 while it's still Friday I think you've just ruined a
2 weekend. You weren't here when we produced those
3 spread sheets showing the man months, and I believe
4 we made the statement that we had substituted Shingle
5 Point for Komakuk because it had been requested by
6 some of the other parties, and the situation was
7 pretty much the same. So unless there's kind of an
8 urgent requirement, we would ask that you accept the
9 materials in Komakuk.

10 MR. VEALE: The Shingle Point
11 material in lieu of Komakuk?

12 MR. MARSHALL: Shingle point, yes.

13 MR. VEALE: Certainly I would
14 like to receive that.

15 MR. MARSHALL: Now, as to your
16 other point, I'm just not certain what it is you
17 require. You want to cross-examine on that information?

18 MR. VEALE: That's correct,
19 I would just like to have explanations of it. I'm not
20 aware of some of the terminology used and just how
21 it affects the construction timing.

22 MR. MARSHALL: Sir, I believe
23 that when we are in Whitehorse dealing with the
24 subject that was covered by your order, we will have
25 as part of the panel, we would call someone in the
26 construction area that could deal with route
27 location and construction aspects, and I'm not certain
28 at the moment who that's going to be because of other
29 hearings that are under way or are to be under way.
30 But I would think that Mr. Veale could direct questions

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1 a member of the panel and find that they have the
2 information that would be required. If there are
3 certain specific things that he's interested in, he
4 could perhaps let me know and I can make sure that
5 we have that at hand.

6 MR. VEALE: That's fair
7 enough, Mr. Commissioner. I've already sent correspond-
8 ence to Mr. Marshall so he would be aware of the things
9 that I'm interested in.

10
11 CROSS-EXAMINATION BY MR. VEALE:

12 Q Mr. Horte, I'm sure
13 that you've had a great deal of discussion about the
14 subject of looping, most of which I have read. I am
15 interested in pinning down the timing relating to the
16 Prudhoe Bay lateral. Now correct me if I'm wrong, but
17 my understanding is that the construction of the Prudhoe
18 Bay lateral would be completed about 1980, is that
19 correct?

20 A Present plan shows that
21 as being completed in 1981.

22 Q 1981?

23 A Yes.

24 Q Would gas then flow in
25 1981?

26 A Yes.

27 Q Now Mr. Gibbs went through
28 this aspect quite a bit as to what the earliest possible
29 date for looping would be, and I suggest to you
30 that it is conceivable that looping on the Prudhoe Bay

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1 lateral could -- the construction of that could begin
2 immediately upon gas flowing. Now is that possible?

3 A No, I don't think that
4 is possible because -- or very unlikely, in that the
5 original flow volumes estimated for the second year,
6 the first year is two billion cubic feet a day, the
7 second year it's 2 1/4 billion cubic feet a day, and
8 as you know, that would only utilize half of the
9 capacity of the 48-inch diameter pipeline, so you
10 would require a growth in that volume of gas available,
11 you'd have to double the original volume of gas
12 available before you'd really fully load the first
13 line, and it would be subsequent to that that you
14 would be looking at looping that lateral.

15 Q Do you anticipate two
16 years then after 1981 for the actual maximum capacity
17 of 4 1/2, what is it, billion cubic feet per day?

18 A No, you know, I don't
19 know what to really anticipate on that line. We think
20 the potential is there to fully load that line,
21 possibly to loop that line. What the timing will be,
22 is a very difficult question as I explained in my
23 previous answers to questions in this area.

24 Q Quite so--

25 A You know, 2 1/2 billion
26 cubic feet a day is a lot of gas. The buildup on the
27 Trans-Canada system, for instance, in Alberta, it
28 now moves just around three billion cubic feet a
29 day and it's been in being since, moving gas since
30 1958.

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1 THE COMMISSIONER: And looped
2 how many times?

3 A Looped on the western
4 section, the fourth loop is not quite -- the third
5 loop is not quite completed. When completed you would
6 have four lines as far as Winnipeg is concerned.

7 Q With the four lines
8 what will be the capacity of the western --

9 A Gee, I would just be
10 guessing. This last line that's ^{being} you know, the last
11 loop that's going in ^{on} the western section, when looped
12 out and fully powered, I don't know how much additional
13 capacity that will add to the present through-put but
14 I could probably get -- you know, but it certainly
15 wouldn't be over, I don't think, an additional billion
16 cubic feet a day.

17 Q So the four lines on the
18 Trans-Canada, when you've got four to Winnipeg --

19 A It will be somewhere
20 maybe in the order of four billion cubic feet.

21 Q It won't equal the volume
22 of your 48 inch line?

23 A One 48, that's right.

24 MR. VEALE: Q Mr. Horte, just
25 to continue, as far as known reserves are concerned, at
26 today's date, it would appear that the most likely
27 place for looping to occur on the entire line would
28 be the Prudhoe Bay lateral, is that fair to say?

29 A No, I wouldn't say that
30 that's the most likely place. That's a very difficult

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1 question because you know, when you extrapolate and
2 try and estimate how future reserves will be developed,
3 you estimate it on sort of an average basis, trying
4 to look at the amount of drilling that's taking place
5 and the anticipated rate of discovery. In other
6 words, if you put a ratio on dry holes to new discover-
7 ies of 1 to 10, or 1 to 5 or whatever, that yardstick
8 that you're using, that is sort of a statistical base,
9 and it doesn't mean that that statistical base is
10 held to in any one year. For instance, what you
11 can very often go through in the exploration end of
12 things is a period in where you go through a very
13 dry spell, if you like, you drill a lot of dry holes,
14 and then all of a sudden you run across really some-
15 thing big. Now when you're averaging that out on a
16 statistical basis, you might say that over a 10-year
17 period the average rate of discovery has been say
18 2 1/2 trillion cubic feet of gas a year. When you
19 look at it in specifics of how that average is made
20 up you may find out that it's made up in, you know,
21 for instance, the Prudhoe Bay discovery, another
22 Prudhoe Bay discovery which, you know, it's the only
23 one of its kind in North America. It doesn't happen
24 that often, but if you use it as a statistical base
25 in Alaska, that would show an average, very high
26 finding rate for a number of years if you found
27 nothing else for a while. So any time you're extrapol-
28 ating, whether it's in the Prudhoe Bay area or in the
29 delta area, you know, you really come up with and
30 you say, "Well, we think it will develop with an

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1 average rate of 2 1/2 or whatever it is trillion
2 cubic feet a day." As we did in our extrapolations
3 in the delta area, but you know, it would just be
4 absolutely fortuitous, and I think unrealistic to
5 assume that it's going to happen in precisely that
6 manner. You may average that over a period of years
7 but just when it will take place is impossible to
8 predict.

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1 Q But it would be fair
2 to say that, as I understand it, you are building
3 the pipeline because of Prudhoe Bay and if Prudhoe
4 Bay were not there you wouldn't be building this
5 pipeline, is that correct?

6 A At the present time
7 we don't think that it is economically feasible
8 to build a pipeline based solely on the reserves
9 now developed in the Mackenzie Delta area, yes.

10 Q -- So --

11 A So it takes the
12 combination of the Prudhoe Bay gas, and the Delta gas.

13
14 Q It would follow then
15 that the most likely place that looping would
16 occur would be from Prudhoe Bay because that is
17 where you know the gas is really at and you know
18 it is there, you are not too sure about the Delta
19 right now or the Beaufort Sea.

20 A No, I think that they
21 are both in somewhat the same situation. You know
22 what is in Prudhoe Bay and that is not going to
23 loop immediately. We are already going to take the
24 volumes from Prudhoe Bay at the levels indicated.
25 It has to be new discoveries in that area that really
26 cause you to loop that line in the near term. The
27 situation is the same in the Delta, in other words, what's
28 the rate of new discoveries going to be in those
29 respective areas, it will be what settles the where
30 and at what time the looping will take place on those

tow laterals.

Q When you take the --

A Yes.

Q When you take that, you

A Yes, because, you

Were you to do so, that

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1 25 year period, because if you don't you can't
2 finance the facilities. Nobody's going to finance
3 youa facility that has to be amortized in order
4 to make gas available in the market competitively on
5 a long term basis and find that they only have
6 a gas supply that is exhausted prior to the pay-
7 out of that debt, and that is the basic method
8 upon which you have to look at gas reserves.
9 Gas reserves are what support the long term financing
10 of the pipeline. You just can't exhaust them over
11 night, as much as you might in a particular situation
12 you wished to do this, otherwise you won't get
13 financed.

14 Q So then, in your opinion
15 then there is no possibility that a political
16 situation could arise or that U.S. demand could be
17 such that they would attempt to get more gas through
18 the line in a shorter time than under the ordinary
19 procedures that you have been dealing with all
20 your life, basically 20 year periods.

21 A No, I don't
22 believe that will occur, sir. I don't think that
23 you could get that approved by the regulatory author-
24 ities or approved pursuant to the deeds of trust
25 and mortgage that you will have to enter into under
26 the initial financing of the pipeline.

27 Q Now, what is the
28 position with respect to the reserves near Prudhoe
29 Bay. Are there known reserves outside the Prudhoe
30 Bay reserve right now that you can rely on?

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1 A There are some reserves
2 -- a field by the name of Kavik comes to mind
3 where I think there are one or two wells that have been
4 drilled into this structure. I think there may
5 be one or two others. Our evaluation of those
6 reserves at the present time -- those that have
7 now been drilled into, is that they are, you know,
8 not too significant in the -- that doesn't mean that
9 they -- won't produce some gas, but they are not
10 major reserve discoveries in terms of trillions of
11 cubic feet.

12 Q What would be the known
13 discoveries then right now?

14 A I would have to
15 give you that answer sir, I can't --

16 Q Would you undertake
17 to do that Mr. Horte?

18 A Yes.

19 Q And -- from what you
20 know now, is it possible to say that within two
21 years of gas going through the Prudhoe Bay lateral
22 that ^{it} is possible that you would actually need to
23 loop that lateral?

24 A You know, anything
25 is possible, sir. I don't think -- my honest opinion
26 is that it wouldn't occur that quickly.

27 Q Mr. Horte, I get
28 the impression when discussing the Prudhoe Bay lateral
29 that the primary interest that your company would
30 be concerned with would be how to get American gas to

1 Americans. Now would that be the ultimate
2 motivating factor for you, is it not?

3 A No.

4 Not at all. The motivating factor is to get
5 gas to the Canadian and the U.S. markets. It is an
6 international project. We certainly put every bit
7 as much emphasis on getting that gas to the
8 Canadian market as we do to getting it to the U.S.
9 Market. It takes both volumes and the Canadian
10 gas is very vital in our opinion to the energy
11 needs of Canada which we think are going to be into
12 problems with within a very few years.

13 Q Well, the Alaskan
14 gas is in fact not going to go to any point in
15 Canada in its ultimate destination, is that correct?

16 A It is going to go
17 to the border points that we have indicated in
18 our application.

19 Q But the ultimate
20 consumer would be an American of the Alaskan gas,
21 is that correct?

22 A Yes, sir.

23 Q Now, you are saying
24 that that basic fact hasn't influenced you in any
25 way, shape or form as to routing or the costs involved
26 in the project, is that right?

27 A Everything influences
28 your -- yes, certainly the Alaskan gas, the U.S.
29 markets that it is going to, the Canadian gas, the mar-
30 kets that it is going to, all influence every aspect

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1 of this project. We think we have come up with a
2 combination by putting those various interests together
3 that in our opinion work to the great benefit of
4 both countries, to a greater benefit than either
5 country could do by moving its own gas strictly
6 within its own country to its own markets.

7 Q You are confident
8 then that you aren't getting any particular
9 pressure from American interests to consider those
10 interests on a higher priority than Canadian interests
11 regarding the routing through the Yukon territory,
12 is that correct?

13 A No, sir.

14 Q Mr. Horte, some information
15 has been disseminated and I have glanced at it, re-
16 lating to gas supply to communities along the
17 route. Now, maybe you could help me on whether or
18 not Old Crow on the Interior Route would be a
19 community where it would be -- would either be
20 economically feasible to do it, to supply that commun-
21 ity or it would be a subsidization situation.
22 Do you have that information?

23 A I think I do sir,
24 if I could get a hold of that report.

25 THE COMMISSIONER: Was this
26 marked as an exhibit, Miss Hutchinson?

27 THE SECRETARY: Yes.

28 A I don't see it listed
29 at first glance in here, sir, -- yes, I do now, just
30 a second.

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MR. VEALE:

Q What page are you
on, Mr. Horte?

A I was just looking at
table three one, page 17, "Projected Areas for
Residential and Commercial Buildings in 1979", and I
see Old Crow listed there and now whether they
did an actual economic calculation on Old Crow, for
the moment I am not certain. They might not have
in that they were looking at the prime route as
being the route that we hope we would be permitted
to build in which case Old Crow would certainly
be located too far away for any economic connection.
I expect, and I would like to check this, that
if the Interior Route were followed, recognizing that
the line is not too far away from -- it passes in
fairly close proximity to Old Crow, that it probably
would be economic, but I would only like to
check that out.

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1 It may be in here, sir.

2 It's been a long time since I've read this in detail.

3 Q Well, would it be
4 possible to find that out today? I'm certainly willing
5 to receive it by letter form, but I would like to know
6 where that specific information is.

7 A Well, if it is in here,
8 sir, I think we can find it out today. If it has
9 not been considered in here, I think it would take
10 us a bit of work to have a look at, and come to a
11 preliminary conclusion at least.

12 MR. MARSHALL: We'll let you
13 know as soon as we can.

14 MR. VEALE: Thank you.

15 Q Just in considering
16 that particular --

17 THE COMMISSIONER: Excuse
18 me, if you're sending that out by mail, send it to
19 all participants and Commission counsel too, would
20 you, Mr. Marshall?

21 MR. VEALE: Q In considering
22 that particular issue, Mr. Horte, of supplying a
23 community in the Yukon, does that cause any difficu-
24 lties considering that the Alaskan gas is primarily
25 destined for the American market? Have you ever
26 considered what effect that would have, or would
27 it be a minimal effect?

28 A It would have no effect
29 at all, sir. What you would do is you would utilize
30 the actual U.S. gas to serve that community, if that's

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1 where the gas was coming from, and you would simply
2 substitute the Canadian gas for the quantity you
3 so utilize.

4 Q And would that also
5 apply -- there's been a great deal of discussion in
6 alternate corridors -- supplying gas in communities
7 like Whitehorse, would the same principle apply?

8 A Identical.

9 Q I'm sorry?

10 A Yes, of course.

11 Q Is it fair to say that
12 in your decision as to routing in the Yukon, the
13 fact of having to supply local communities, say, in
14 the southern part of Yukon would not really have
15 entered into the equation at all, that wouldn't have
16 been a significant matter because you would simply
17 have the Americans receive a certain amount of Canadian
18 gas for whatever they had lost in transit through the
19 Yukon?

20 A Yes.

21 Q The basic decision as
22 to routing in the Yukon, I understand, was made a
23 number of years ago, 1971 or '72, and I was wondering
24 just what the process was within your organization.
25 Was that in fact a management committee decision?

26 A Yes, the alternative
27 routes were all looked at by the Management Committee,
28 yes, and the Management Committee agreed with
29 management's recommendations that the two routes that
30 they felt were feasible and could be proceeded with,

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1 depending on the decision made by the regulatory
2 authority, were the prime route that we have applied
3 for and the alternate we have shown.

4 Q You stated that --

5 A We have done, as you
6 know, many other alternates, but in our opinion they
7 are not desirable or feasible, and aren't being
8 proposed by this group. They're there to show
9 our reasons for why we chose what we chose instead
10 of those.

11 Q Right. You just made
12 a comment that the Management Committee followed the
13 recommendations of or the decision of some other
14 --

15 A Well, the management
16 of CAGSL, our recommendations, we're the management.

17 Q I see, that was your
18 recommendation?

19 A We make recommendations
20 to the Management Committee.

21 Q And they endorse that
22 recommendation.

23 A Yes.

24 Q And that means, of
25 course, that there was no detailed exercise by one
26 of the three groups?

27 A No, none whatsoever.

28 Q Now I would like to get
29 into some of the parameters with respect to alternate
30 routing through the Yukon Territory, and you have

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1 indicated in your examination in chief that engineering
2 and environmental considerations were paramount in
3 coming to the decision as to routing. Now, could you
4 tell me what the detrimental or the weak aspects of
5 engineering and environmental aspects were relating
6 to the other routes through the Yukon, and I'm parti-
7 cularly referring to the Fort Yukon corridor and the
8 Fairbanks corridor.

9 A I think that other
10 witnesses can do a much better job of that than I
11 can.

12 Q O.K., that may be
13 fair enough. The thing that I, Mr. Commissioner, I
14 get some concern here because sometimes we ask other
15 witnesses what they think, and that turns out to be
16 a policy question.

17 A If it does, I'll come
18 back and answer, but I'd really, you know, I just
19 don't think I can go into it and give you a very
20 worthwhile explanation as to all the environmental
21 differences between those routes. Other people can
22 do that much better than I.

23 MR. VEALE: I see. Well then,
24 Mr. Commissioner, I would interpret that as meaning
25 that Mr. Horte, if necessary, would come to Whitehorse
26 when that entire matter is aired.

27 MR. MARSHALL: Well, I
28 suppose you're intitled to interpret it any way you
29 like. THE COMMISSIONER: Well,
30 If he doesn't come to Whitehorse, I interpret
it as meaning he will at least come to Yellowknife.

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MR. VEALE: But I may not.

THE COMMISSIONER: Well, I'm sure we can work that out. If we can't get him to Whitehorse, we'll get you to Yellowknife.

MR. MARSHALL: We'll try to call evidence at Whitehorse that will deal with the subjects that you've been expressing an interest in, Mr. Veale, and as Mr. Genest has previously indicated, at some time in the future Mr. Horte will be called back as policy witness, so if there are some policy considerations arising out of the evidence that's given at Whitehorse, you'd be able to get into them with him at a later date.

MR. VEALE: Q Well, Mr. Horte, the position you've taken on the southern alternate routes through the Yukon, does that also apply to your knowledge about the primary and interior routes? Do you feel confident to speak about those routes in your application?

A Not in any detail, sir, if you want to get into any particular environmental concerns, etc., other than to tell you, as I have, on a broad basis that we chose the primary route that we chose over the interior route for two reasons: Both the environmental reason and the economic reason. We felt the prime route was more advantageous for both of these reasons.

Q When you considered the prime route and the interior route did you ever receive or consider a proposal that a third

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1 route be considered and that route would be one that
2 ran south of Old Crow and avoided the Canadian portion
3 of the proposed International Wildlife Range, and
4 subsequently went up the Dempster Highway. Have you
5 ever directed your mind to that particular proposal?

6 A I don't think so, sir.
7 But I'd like to check that.

8 THE COMMISSIONER: What was
9 that again, that went south of the proposed Wildlife
10 Range in the Yukon, south of Old Crow and then where
11 did it go?

12 MR. VEALE: Then it went
13 across to the Dempster Highway.

14 THE COMMISSIONER: Down the
15 Dempster to Dawson?

16 MR. VEALE: No, it went up the
17 Dempster to the Mackenzie River.

18 THE COMMISSIONER: Oh, up the
19 Dempster to Fort McPherson? And then to Travaillant
20 Lake?

21 MR. VEALE: That's correct.

22 A Well, you say go back
23 up the Dempster?

24 Q Yes.

25 A I'm sure we've never
26 considered that. You start zig-zagging a main pipeline
27 around like that and the cost becomes very prohibitive.

28 Q Well, I don't know, may-
29 be you misunderstand, it doesn't appear to be quite
30 a zig-zag, it would simply be a third way of bringing

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1 it across the northern part of the Yukon, it doesn't
2 really involve much more zig-zagging, I don't think.

3 A Doesn't it come south
4 and then go back north?

5 Q Yes, effectively it does
6 that to go up the Dempster, but it's an angle rather
7 than a perpendicular.

8 A It would add a lot of miles

9 Q But you can categorically
10 state --

11 A I'm sure we haven't
12 considered that one.

13 MR. MARSHALL: We'll check that
14 point.

15 A I'd better check it out
16 but it would seem to be a rather --

17 MR. VEALE: I liked your
18 first one better.

19 A -- a screwball one
20 to look at.

21 Q Well, we'll hear more
22 about that. Mr. Gibbs went into the question of
23 who was going to be paying the price of bringing the
24 gas through in terms of the ultimate consumer, and
25 I think he was driving at the point that^a Canadian
26 consumer was going to be subsidizing gas going
27 through to the American consumer, this is over the
28 length of the line and the particular calculations
29 done. Now, I'm sure you've been through that ad
30 nauseam. What is your basic position on that? You

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1 were saying that a Canadian consumer is not in any
2 way subsidizing an American, or is it the reverse, an
3 American is subsidizing a Canadian consumer?

4 A I think the M.c.f. mile
5 method of rate calculation is a very fair method of
6 calculation. You can always get arguments about any
7 method of calculation, somebody taking the position
8 that that method subsidizes one or the other; but
9 historically at least, and I've sat in on many rate
10 hearings where these things have been involved, and
11 you get many arguments and I'm not saying that the
12 regulatory body may not decide on some other method of
13 allocation if they felt it was unfair, but at least
14 historically in our business this seems to be the one
15 most often used, the M.c.f. mile allocation as
16 being equitable and fair. If they find otherwise,
17 I am sure we will live with whatever basis they
18 decide. Insofar as the pipeline itself is concerned,
19 as a contract carrier, our, you know, primary interest
20 is to make sure that the revenues we receive for
21 carrying that gas are sufficient to make the operation
22 viable, and if the authorities were to decide that
23 the rates should be distributed differently, so long
24 as the total dollars came out the same, it really
25 wouldn't affect the operation of the pipeline and
26 they will be going into that, I'm sure, in great detail
27 to come to the conclusion as to what they think is the
28 most equitable. Whatever that is, we will live with it.
29
30

V.L. Horte
Cross-Exam by Veale

1 THE COMMISSIONER:What,
2 you said to Mr. Gibbs yesterday that the zone
3 gate method was in fact in use on the TransCanada
4 system.

5 A No, I said the Mcf mile
6 method that is in use on the TransCanada system.

7 Q Oh, I see, I thought
8 you acknowledged at ^{the very end} of the series of questions
9 he put to you that the zone gate method --

10 A No, on Alberta
11 Gas Trunkline.

12 Q Oh, Alberta Gas TRunkline.

13 A Alberta Gas Trunkline,
14 that the effect of how they set their rates is
15 very similar to a zone gate method.

16 Q Now, Alberta Gas
17 Trunk falls entirely within the jurisdiction of
18 the Alberta Government, does it?

19 A Yes.

20 Q Does the N.E.B. do any
21 regulating of Alberta GAS Trunk?

22 A No, they do not.

23 You know, there is a great
24 deal of historical background to why Alberta Gas
25 TRunkline may in effect have ended up on what is
26 more closely a zone gate concept than anything else
27 and that is because the original facility built
28 by TrunkLine, the original facility was built with
29 gas only going from that facility to eastern Canada
30 subsequent to that an additional system of theirs and

1 separate from the plains division system, was
2 brought into being to move gas to the California
3 market. Each company in the case of TransCanada
4 paid the cost of service with respect to what
5 we used to call the plains division. The Pacific
6 Gas and Electric system, or Alberta Natural,
7 if you like, payed the cost of service for moving
8 the gas that they gathered on what was
9 then called the Foothills Division, or
10 system of Alberta Gas Trunkline.

11 As time went on, and
12 as purchasing took place for new reserves being
13 developed by TransCanada and
14 by Alberta Natural in the eithers -- in the case
15 of TransCanada they were buying gas over in what
16 was the foothills area and Alberta Natural
17 buying gas over in the plains division area, then
18 there began to be some common use of what were
19 originally facilities dedicated exclusively to the
20 one transporter and then what they did
21 depending on the point of expansion was that the
22 one user was not prepared to pay for expansion
23 of the other, etc., and so they worked out
24 primarily it still is the two divisions except
25 where there are common usages made and there it is
26 allocated on the mileage that gas is jointly transported
27 through a common facility.

28 So, it really isn't in
29 my opinion analogous to a zone gate concept, although
30 I agreed in general terms yesterday, but it really

V.L. Horte
Cross-Exam by Veale

1 isn't.

2
3 THE COMMISSIONER:

4 Thank you.

5 MR. VEALE:

6 Q Mr. Horte, basically
7 the applicant has committed itself to saying that the
8 best route through the Yukon Territory is your primary
9 route along the North Slope and then you have taken
10 the position that if you could not take that route
11 the alternative route would be through the Old Crow
12 region of the Yukon Territory. Now, if it came
13 to pass that it was demonstrated that there were
14 other routes through the Yukon Territory which
15 had advantages to them, what is the policy of the
16 applicant at this time? Are you prepared to consider
17 such routes or are you saying if it is not what
18 we have asked for, no pipeline?

19 A No, I can't take
20 that latter position. I think that, you know, we
21 have tried to look at the various major alternatives
22 that seemed logical to us, at least in the -- that
23 other people had raised, etc., that were being
24 talked about and we have put those forward in our
25 submissions here. Now, were somebody/come up with
26 a brand new alternative that in effect meant that
27 you had to start over from scratch, you know, I just
28 can't categorically say we wouldn't look at it,
29 you know, I think it would, -- you'd probably get
30 to the point in time where sponsors would not
be prepared to put up the money to continue studying

V.L. Horte
Cross-Exam by Veale

1 the project. It is a very costly procedure we
2 think we have taken a real good look at what makes
3 reasonable economic sense, environmental sense,
4 etc., and major variations from that, I think

5 may well mean that we wouldn't proceed. Now,
6 that doesn't mean that particular segments or portions
7 of the pipeline on the routes that we have suggested
8 couldn't be altered and certainly I have indicated
9 here, that we are prepared to respond to suggestions
10 and see what can be done to accomodate things
11 that maybe we haven't taken into consideration,
12 but if you talk about a major rerouting of this
13 project and then going through the whole process
14 again, frankly, I would be surprised if the sponsors
15 would be preapred to continue under those circumstances.
16 I am only giving you an opinion, they would have
17 to look at it of course and we would have to be
18 directed by them, but that would be my
19 expectation , sir.

20 Q Would that expectation
21 apply to the situation where the for one reason
22 or another the state of Alaska said, "Prudhoe Bay
23 gas will only go down the Fairbanks corridor." Now,
24 does that in any way change what you have just
25 said? That would be of course something that we
26 would have no control of in this country.

27 A Well, we tried to --

28 MR. MARSHALL: It may be
29 something that the State of Alaska would have no
30 control over either, Mr. Veale, but we are talking in

V.L. Horte
CROSS-Exam by Veale

1 hypothetical situations, I think that Mr. Horte
2 can answer.

3 MR. VEALE:

4 Q Well, go ahead and
5 answer, Mr. Horte --

6 A Well, those decisions
7 would have to be made by the -- not the State
8 of Alaska, although they would have input by the
9 Federal Power Commission of the United States. My
10 opinion would be that if you are thinking of the
11 alternate route which we showed -- looked at coming
12 down to Fairbanks and then following on down from that
13 route, my opinion would be no. It is not feasible.

14 Q So basically then,
15 getting back to my original question as to whether
16 or not you would ultimately arrive at a no pipeline
17 situation, you are saying that that would be such
18 a situation?

19 A That is my opinion, sir.

20 Q Going back to the Interior
21 route through Old Crow, I understand that the
22 policy with pipelines across the country is that
23 you compensate the owner of the property for any damage
24 that may have been caused while your pipeline was being
25 constructed or some such thing. Now, what
26 would happen when you are constructing the Interior
27 Route for instance and someone alleged that their
28 particular trapline or hunting area was detrimentally
29 affected, what is your policy with respect to that
30 kind of problem?

1 A Well, you would
2 have to consider the evidence being presented and
3 what the damage was and certainly try to work out
4 an equitable compensation for it.

5 Q So there is really
6 no difficulty in principle, it is just a question
7 of working it out.

8 A Not in principle,
9 sir.

10 Q Well, let's take
11 the situation then where your Interior Route runs
12 alongside a large body of water called the Old
13 Crow Flats. Now, what would happen in the situation,
14 and I state this as a fact that would happen
15 where because of the construction of the pipeline,
16 it was demonstrated that the water table of the
17 Old Crow Flats was affected to the extent that
18 people of the Old Crow could not hunt there in
19 their traditional way. Now, that is more than
20 just affecting, say, one person. That is affecting
21 a community. Now, what would be your policy in
22 that situation?

23 A I can't really visualize
24 that situation. If the situation you suggested
25 is even a probability I don't think that we would
26 be permitted to locate the pipeline there in the first
27 instance and, you know, I cannot visualize the
28 situation that you are talking about.

29 Q So that particular
30 problem that I have posed is one that has never

V.L. Horte
Cross-Exam by Veale

1 been considered by the applicant, then?

2 A No, it hasn't. You know,
3 normally I think what we are considering is fundamen-
4 tally once granted the permit, that the responsibility
5 in connection with damages, etc., is more related
6 to that right-of-way than the broader aspect because,
7 you know, where do you define the boundary of the
8 project if it is deemed to be in the Canadian
9 public interest, I don't know. Maybe we will get
10 some guidance on that in the regulatory approval pro-
11 cess, but, you know, I don't know how far you can
12 carry that.

13 MR. MARSHALL: Excuse me,
14 Mr. Veale, just going back to your question, it
15 wasn't clear to me whether you were posing a hypotheti-
16 cal situation, you used the term "fact" --

17 MR. MARSHALL: no, I was
18 doing that so hopefully Mr. Horte would consider it,
19 but he didn't wish to sconsider that possibility.
20 It was a hypothetical question, certainly.

21 THE COMMISSIONER: It hasn't
22 happened yet. That means it is hypothetical.

23 MR. MARSHALL: No, what I
24 was really interested in is whether or not Mr.
25 Veale was basing it on some factual information if
26 you like to the effect that such a result would
27 entail, in the event that a pipeline were built or
28 whether or not this is just a hypothetical situation.

29 THE COMMISSIONER: Well, it
30 is bound to be hypothetical because no one has built

V.L. Horte
Cross-Exam by Veale

1 there.

2 MR. VEALE: If I ever
3 obtain the facts, Mr. Marshall, you will be the
4 first to hear.

5 Q Basically then,
6 Mr. Horte --

7 THE COMMISSIONER: Well,
8 excuse me, maybe I am not treating Mr. Marshall's
9 point seriously enough. If this is an allegation
10 that you intend to support by evidence in due course,
11 we will expect you to advise us as soon as you are
12 in a position to.

13 MR. VEALE: Well, no,
14 I certainly would -- I wasn't being facetious,
15 I would certainly advise this Commission .

16 MR. MARSHALL: My point in
17 commenting, sir, was that, you know, that the
18 Arctic Gas group has seriously considered the
19 environmental impacts of these various alternatives
20 and the basis of my discussions with the various
21 people there was never any indication of this
22 sort of possibility and I was just wondering if
23 Mr. Veale had other information.
24
25
26
27
28
29
30

V.L. Horte
Cross-Exam by Veale

1 MR. VEALE: No, I don't at
2 this particular point in time. But what I was driving
3 at, Mr. Horte, is that I'm trying to direct your mind
4 to the possibility of some sort of major environmental
5 catastrophe as a result of the pipeline which, you know,
6 your experts haven't been able to foresee, and just
7 to think about what would happen as a result of the
8 damage that resulted, what would be the policy of the
9 applicant? Do you have anything further to add on that?

10 A No, I think we view
11 our responsibility mainly being associated with the
12 right-of-way and with our operations in connection
13 with operating the pipeline. The kind of thing that
14 you hypothetically put forward were a result that
15 we had not contemplated, it's certainly a question in
16 my mind whether that would be a responsibility of
17 ours, or a responsibility of the government's who in
18 the first instance took all this into consideration
19 when they determined it was in the public interest
20 and therefore whether it wouldn't be their responsibility
21 or joint responsibility. You know, you're getting into
22 an area that's frankly beyond me.

23 Q If the applicant
24 receives regulatory approval, and the land claim
25 situation, which I'm sure you're aware of, has not
26 been resolved, would it be the policy of the applicant
27 to proceed in any event once the government has granted
28 the authority to you?

29 A If the government
30 grants the authority and that authority permits us to

V.L. Horte
Cross-Exam by Veale

1 proceed to build the pipeline, yes, we will proceed
2 with the pipeline.

3 Q Now, as I understand
4 it, one of the great by-products of the construction
5 of the pipeline is the associated hydro-carbon develop-
6 ment. Now, is the interior route, does that pass
7 through any potential areas for associated hydro-
8 carbon development?

9 A Yes, there is potential
10 for a hydro-carbon development in that area.. The
11 -- to my knowledge the exploratory effort that has
12 taken place to date in and along that area has been
13 rather unproductive, and I'm just saying we're not
14 looking forward to big things for that area.

15 Q But it would be fair to
16 say that once the pipeline is constructed, on the
17 part of the producers it becomes a great incentive
18 to determine whether or not the potential is there
19 in the area long the right-of-way.

20 A A greater incentive,
21 yes sir, because if you're to find something you
22 have greater access to a market outlet than if it's
23 isolated by itself where you'd have to find something
24 large, let's say, in order to make it economic to
25 move it to market than you would if there were facilit-
26 ies close at hand.

27 Q When you spoke about
28 the fact that exploratory work was done, say, in the
29 Old Crow region, and I specifically refer now to the
30 Old Crow Flats, is that the area where you indicate

V.L. Horte
Cross-Exam by Veale
Cross-Exam by Scott

1 it's been unproductive to this point?

2 A I can't be that
3 specific, sir. I just know generally that exploration
4 all along that area has not been very productive.
5 People in the industry are not very enthused about it,
6 let's put it that way.

7 MR. VEALE: That's all my
8 questions, Mr. Commissioner.

9 THE COMMISSIONER: Thank you,
10 Mr. Veale.

11
12 CROSS-EXAMINATION BY MR. SCOTT:

13 Q Mr. Horte, some tag end
14 questions that occur to me. Mr. Bayly asked you about
15 the problems associated with the location of the
16 compressor station at a place he identified as if
17 he knew it, called Big Eddy, which I think is
18 compressor station CA-08, up near Aklavik. Have
19 you discussed with him generally the ability or the
20 inability to move compressor stations, and I think
21 your evidence and the evidence of another panel was
22 that they're like beads on a string, and if you
23 move one it makes it more difficult, if not impossible,
24 to move the next one. Is that correct?

25 A Yes

26 Q I take it, however, that
27 that consideration applies only to the compressor
28 station itself, and not to the facilities that maybe
29 associated with it such as wharves and docks and
30 landing pads and other accessories.

V.L. Horte
Cross-Exam by Scott

1 A Yes.

2 Q So that if the -- if it
3 were considered in the interests of the community, it
4 would be possible from time to time, subject only to
5 economic constraints, to move the accessories that
6 are associated with the compressor stations, though
7 perhaps it might not be possible to move the compressor
8 station itself.

9 A Yes,

10 Q Well now, let me ask
11 you one other question about compressor stations. You
12 and the other panel have described the limitations on
13 one's ability to move them, and I take it that that
14 -- the essential constraint there is that they must
15 be spaced at particular defined intervals so that
16 pressure will be maintained at a certain level.

17 A Yes. If you change
18 your interval, you greatly change the throughput of
19 the pipeline itself.

20 Q Yes. Leaving aside
21 economic considerations for a moment, and assuming that
22 it would be impossible to move a compressor station
23 because of that problem, would it be possible to con-
24 struct a loop between the compressor stations so that
25 the compressor station could in fact be moved?

26 A Those are possibilities,
27 yes sir.

28 Q And I take it that the
29 cost of providing that loop would be substantially
30 reduced by virtue of the fact that it might be possible

V.L. Horte
Cross-Exam by Scott

1 to do it at the same time as the original construction
2 work was being done rather than later.

3 A I think there would be
4 probably be advantages in that, yes.

5 Q So that apart from
6 economic considerations, the problem -- the possibility
7 of looping holds at least potentially the solution
8 to the problem of moving certain compressor stations
9 if it should be judged necessary to move them.

10 A Yes, it depends on the
11 degree of the move, but that is a possibility.

12 Q What are the limitations,
13 if any occur to you now, on the ability of that remedy
14 to assure some kind of mobility? Or are you prepared
15 to say at the moment?

16 A It would, you know, you'd
17 need to have a real good engineering look at it, sir.
18 I couldn't get very specific about it.

19 Q Well now, turning to
20 another subject, you've discussed with a number of
21 counsel, including latterly Mr. Anthony, the necessity
22 as you see it of compensating trappers and other
23 land users on some basis insofar as their land use
24 or their trapping activity is damaged or hindered or
25 destroyed, and we've heard what you said on that.
26 Let me ask you, has anybody given any thought to the
27 machinery that would be devised to deal with these
28 claims?

29 A Not to the extent that
30 it's come to my attention, sir.

V.L. Horte
Cross-Exam by Scott

1 Q I take it that you would
2 agree with me that the applicant, having adopted this
3 policy of compensation, some kind of machinery would
4 have to be devised and communicated to persons so
5 that the claims could be asserted, examined and where
6 appropriate, paid.

7 A Yes, to the extent that
8 there isn't already machinery for that, I guess that
9 would be so.

10 Q Do you have in mind any
11 existing machinery? Or are you just reserving that
12 as a possibility?

13 A Just the normal laws in
14 connection with compensation for damage done to other
15 people's property.

16 Q But I take it that
17 as a matter of policy you aren't contemplating a
18 person who finds himself in this situation should be
19 obliged to go the route of a normal lawsuit, are you?

20 A I don't know, maybe that
21 is the way that it should be done.

22 Q Well, I put it to you
23 that as a matter of policy, Arctic Gas would want to
24 devise some kind of machinery ad hoc and suited to
25 the purposes that you have in mind so that these
26 claims can be expeditiously examined and dealt with.

27 A I don't know, that's
28 a question I'll have to put to our lawyers, I think.

29 Q As a matter of policy,
30 do you recognize the general necessity of allowing

V.L. Horte
Cross-Exam by Scott

1 these claims to be determined and paid before the
2 construction work is commenced?

3 A I don't see how you
4 could do that if you don't know what the -- how would
5 you evaluate what the damage has been before you
6 start with construction?

7 Q Well, is it your policy
8 position that these claims cannot be evaluated
9 until, as a general principle, until the work has
10 been done and completed?

11 A It isn't a policy. It
12 just seems to me impractical how would you apply
13 something like this unless you did it in that manner?

14 Q I see. Have you got
15 any task force working on proposals for this kind
16 of --

17 A Not to my knowledge,
18 sir.

19 Q Well now, the one
20 other tag end. When we dealt with the panel that
21 laid out the alternative communication systems that
22 had been devised in support of the construction and
23 operation of the pipeline we were told that a decision
24 was in the course of being made by Arctic Gas as to
25 whether it should opt for microwave or satellite.

26 I wonder if you can tell us:

27 (a) whether that decision has been made;

28 (b) when it's going to be made if it hasn't been made?
29
30

V.L. Horte
Cross Exam by Scott

1 A That decision has not
2 been made, notwithstanding what you read in the paper
3 undoubtedly.

4 Q I didn't read anything
5 in the paper.

6 A I see, but I think it
7 will be in the very near future, yes, I can tell you
8 that at this time certainly things are pointing
9 favourably towards the use of Tel-sat.

10 Q Can we anticipate a
11 decision in the next couple of months?

12 A It may well be made
13 within the next couple of months, I would hate to be
14 pinned down to that, but I think that's a good likelihood.

15 Q Well, I would like to
16 ask you some questions on control of the project.

17 First of all, I am not
18 certain whether you have dealt with this before, if you
19 have just tell me and I will read the record and stop
20 asking you. Who are the participants in Northcan
21 Engineering and Management Limited?

22 A I think I can recall m
23 most of them sir. S.N.C Engineering, a construction
24 firm of Montreal is one of the Participants.
25 The Foundation Company of Canada, Bannister Construction,
26 Santa Fe, Bow Valley Industries, yes, and Acres. I
27 think that's everybody.

28 Q And I take if from
29 your prepared evidence, that this firm was really
30 incorporated substantially to provide services to

1 Arctic Gas in the construction management field?

2 A I think we were the
3 main reason for their getting together. As I understand
4 it they certainly intend as a group to offer services
5 to others as well.

6 Q Yes, but is it also
7 correct to say that so far at least they have not been
8 retained to do any construction management, but merely
9 to provide some support studies to the N.E.S. developed
10 construction plan?

11 A Yes, that's basically--

12 Q Yes. When do you
13 anticipate that they will complete their work? In
14 connection with these studies?

15 A Well, I think our
16 arrangement with them is through 1976, subject to our
17 right to discontinue the arrangement at any time within
18 thirty or sixty days notice.

19 Q Well, you have listed
20 on page 20 of your prepared evidence the five things
21 that they have been asked to do. Have they been asked
22 to comment or do any studies in support of, or analyse
23 the work schedule?

24 A Yes, they are looking at
25 reviewing that work schedule, certainly in looking at
26 the implementation of that plan, and whether it requires,
27 in their opinion, from a straight construction standpoint,
28 any modifications, you know -- you can't do one without
29 sort of doing the other if you like.

30 Q Well, I am speaking

V.L. Horte
Cross Exam by Scott

1 personally, but I don't intend to be around here very
2 far into 1976.

3 MR.MARSHALL: Is that a
4 promise, Mr. Scott?

5 MR. SCOTT: No, it's not.

6 THE COMMISSIONER: It will
7 be one of his shorter cross examinations.

8 MR. SCOTT: Q May we
9 expect that some of the studies and analyses that they
10 do will be available this year?

11 A I don't whether their
12 studies will be sufficiently along in any of those
13 areas that they would be you know, conclusive. I just
14 don't know. You know, you sort of have to go all the
15 way through before you get to the end, and if you stop
16 halfway you really don't have much.

17 Q In short, you can't
18 say?

19 A No.

20 Q Has Arctic Gas decided
21 on a construction manager?

22 A No sir.

23 Q When do you-- I'm
24 sorry did you want to add something?

25 A Well, just as I see it,
26 CAGSL is the construction and engineering manager. Now
27 you are talking about somebody to assist us, or implement
28 engineering and construction in both areas. We are
29 responsible, we are not going to turn that over to
30 anybody.

V. L. Horte
Cross Exam by Scott

1 Q Well that perhaps is
2 what I want to get at. I understand that at
3 for example, it was the policy of Alyeska, the owner,
4 to hire a construction management firm, the BEchtel firm
5 who were in fact, in essence, construction
6 managers under the owner. Is that your understanding?

7 A That's my understanding,
8 yes.

9 Q Have you given any
10 consideration to adopting or to not adopting that
11 approach to this project?

12 A We have considered it
13 certainly, and have reached no conclusion at this stage.
14 You know, I think the thing that can be easily
15 misunderstood, is that you know that when somebody is
16 appointed as construction manager, that can have many
17 meanings depending on how that appointment is made. It
18 depends upon how much responsibility you give that, so-
19 called construction manager, as to whether it might be
20 interpreted by somebody as meaning you have turned
21 everything over to them, or you have retained them to
22 take specific responsibilities and in all cases having
23 to-- setting out the guidelines etc. with respect to
24 those matters that you always have to make a decision
25 on.

26 There can be all sorts of
27 degrees, as to how far you permit somebody to go, or not,
28 in that area.

29 Q Well, I think I see the
30 trade offs that are at stake in hiring a construction

1 manager in the broad sense, and in not hiring one, and
2 the values that are at issue, and I think I also
3 understand you to say that you haven't yet made that
4 decision?

5 A Well, I think we have
6 fundamentally made the decision from this standpoint,
7 that we are going to control very closely every aspect
8 of it, all the way through. So, the question really
9 fundamentally amounts almost to this: "Are you going out
10 to hire those people to put them on your own staff, or
11 are they already there in organizations and can perform
12 these functions to the extent that you assign them
13 responsibility outside of your own organization."

14 But let's say this, as
15 opposed to what on maybe southern projects quite often
16 companies have assigned the whole deal to a construction
17 manager, and relied upon him to get the job done. And
18 he's undertaken it for a contract price. He goes out
19 and does all the sub-contracting and what have you, and
20 it's his baby. That's just not possible in our opinion
21 with respect to a project such as this, through the
22 environment, through the area that it's going through,
23 with all the problems associated with it. In our
24 mind that would be a very irresponsible position for a
25 company to take. We have to carry much more responsibility
26 than that.

27 I see them being mainly used
28 as implementing. We are going to be in control, and
29 they will be carrying out many of the functions. That's
30 about as close as I can describe our thinking on it.

V.L. Horte
Cross Exam by Scott

1 Q I take it that in the
2 south for example as you have said, and perhaps Trans-
3 Canada is an example, the traditional approach would be
4 to, as you say, hire a construction management firm, and
5 make the construction their baby, rather than the
6 owner's baby?

7 A Well, I wouldn't want
8 to say that Trans-Canada did that. You know, in areas
9 that you are familiar with etc. and that they are
10 fairly straightforward, this has often been done.

11 Q Could you try and list
12 for me the considerations in this project, with as
13 much precision as you can, that make that technique
14 unsuitable? And perhaps I can start you off with a
15 list. I take it one of the first items would be your
16 sense that Arctic Gas has an environmental
17 responsibility that it will not pass off on some
18 construction manager?

19 A That's one, yes sir.

20 Q Yes. Any others?

21 A Well, I think the
22 same situation pertains to the many of the sociological
23 considerations, the hiring of Northerners, the training
24 of Northerners, how that's going to operate having
25 regard to union situations. The basic economic facts
26 of the project, is that we wouldn't feel comfortable
27 to turn over the responsibility of a project this large,
28 if it happened to end up being poorly done, and it took
29 you six years to construct, rather than three years
30 to construct, you might go broke in the process.

V. L. Horte
Cross Exam by Scott

1 It's just too large, and too
2 many ingredient's involved to turn the responsibility
3 over to somebody else.

4 Q Well having listed in
5 a general way those factors, isn't it relatively clear
6 that you're not very far from your final decision. It's
7 clear that you are not going to hire a construction
8 manager in the traditional sense?

9 A In the traditional
10 sense, I think we've reached that decision. Yes sir,
11 we're not going to do that.

12 Q Yes, and therefore we
13 may expect that Arctic Gas will maintain itself, on-
14 the-job control of design, of environmental impacts
15 of socio-economic impacts, and of construction techniques?

16 A Yes sir.

17 Q And any contractors
18 that are hired, are hired to perform assigned tasks
19 under the direction and control of Arctic Gas?

20 A Yes sir.

21 Q Has your organization
22 or N.E.S. done any studies on the -- or prepared any
23 analysis of the experience in Alaska, which was as you
24 know, a different experience?

V.L. Horte
Cross-Exam by Scott

1 A Not to my knowledge, sir,
2 no.

3 Q Well now, in your evidence
4 on page 21 you say -- and I just quote a portion of it.

5 "It is essential in controlling the project
6 to make sure that what is constructed is what
7 has been designed, and that any on-the-spot
8 changes in design not be carried out by those
9 constructing the project, but only changed
10 by the design engineers."

11 Now stopping right there, I take it that that is one
12 of the important factors that work in favor of on-the-
13 spot Arctic Gas control and management.

14 A Yes.

15 Q Well now, Arctic Gas
16 doesn't have, I gather, a floatilla of design engineers
17 at the moment. What are you going to do to get them?
18 Are you going to employ N.E.S., or are you going to
19 go elsewhere?

20 A Well, the way we visual-
21 ize this being organized is that we will have very
22 competent and senior people involved. We certainly
23 intend to use the services of Northern Engineering
24 Services, if you like, to carry out many of those
25 functions for us. But in the final analysis, changes
26 will be only made if they are approved through a
27 mechanism that CAGSL is the party that approves the
28 change itself. In other words I'm not saying that
29 we're going to have one of our engineers on every
30 spread. We may have the most competent engineer, we

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1 may be able to have more competent engineers from
2 N.E.S. on those spreads and it's a matter of control.
3 How do you exercise the control in the field to the
4 decision-making process? That has to be done in a
5 manner so that CAGSL is in control.

6 Q Well, how do you
7 exercise that control in that eventuality?

8 A Well, you have to
9 have control set up so that modifications to the
10 design are made in the field, they have to be
11 reviewed, they have to go back and have the approval of
12 CAGSL, whether he's on the job or in the head
13 office.

14 Q Well then, does it
15 come down to this, that at least insofar as design
16 changes in the field are concerned, you contemplate
17 either hiring a design staff directly, or utilizing
18 N.E.S.'s staff, or a combination of both?

19 A Yes.

20 Q And that staff will
21 provide field service.

22 A Yes.

23 Q And that insofar as you
24 hire N.E.S. people, they will respond to direction
25 and control that is given exclusively by Arctic Gas.

26 A I visualize those
27 people, although they're in a different organization,
28 filling the same responsibilities and working as
29 though they were part of the CAGSL staff.

30 Q Well now, Dr. Hardy of

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1 R.M. Hardy & Associates, gave evidence here and
2 indicated that in order to perform this function
3 a design support staff of -- and monitors, inclusive
4 of monitors, I think -- would range between 800 and
5 900 people. Do you accept that an analysis as a require-
6 ment?

7 A It will be a large
8 number. It may very well be in that order, I can't
9 speak in exact hundreds, but it will be several
10 hundred.

11 MR. SCOTT:
12 Now, not a question for
13 you, Mr. Horte, but at this point I can't resist
14 reminding my friend, Mr. Marshall, that in Volume 29
15 of the transcript he undertook to provide a breakdown
16 of the disciplines that that force would represent,
17 and the characteristics of the monitor and design
18 staff in the field. Perhaps before our next meeting
19 he can come to that.

20 MR. MARSHALL: It wasn't too
21 clear to me, going back through these outstanding
22 undertakings, whether or not Mr. Scott, you had
23 asked about environmental disciplines that would be
24 represented on O. & M., and I thought you had asked
25 about that and only about that, and that an answer
26 had been given. Do I take it that --

27 MR. SCOTT: No.

28 MR. MARSHALL: Have you got
29 a specific reference? It would help me.

30 MR. SCOTT: The reference I
have, I don't ^{have} the volume here as Volume 29, page 3624

1 to 3626. What I would like, if there is any lack
2 of clarity, Mr. Commissioner, is a breakdown of the
3 construction, design, environment, socio-economic
4 support staff, into disciplines and as Mr. Marshall
5 has noted, also a breakdown of the O. & M. support
6 staff in terms of disciplines.

7 MR. MARSHALL: Well, I think
8 the O. & M. staff was covered in the evidence of the
9 panel, and there would be people with broad knowledge
10 in various disciplines in the districts, and they
11 would be in contact with experts in each of the
12 various disciplines at Calgary. I don't know whether
13 we can give you more information than that, Mr. Scott.
14 It seemed to me that that answered the question, as
15 it was put at the time.

16 MR. SCOTT: I think we also
17 asked you, relating to O. & M., Mr. Commissioner,
18 what support staff -- we were told first of all that
19 there would be at each district office a multi-purpose
20 disciplinarian who would be able to give advice and
21 if not, he --

22 THE COMMISSIONER: Multi-
23 purpose disciplinarian?

24 MR. SCOTT: I'm sorry.
25 That's the definition of a judge.

26 THE COMMISSIONER: That's what
27 we need around here, I think.

28 MR. SCOTT: A multi-discipline
29 person and that if the answers could not be provided
30 would phone Calgary, and I think we also pursued what
sort of staff you were going to have at Calgary to

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1 respond to these O. & M. problems. Perhaps Mr. Mar-
2 shall can take that under consideration.

3 Q Now, Mr. Horte, you have
4 indicated to us clearly that design changes and
5 construction responsibility is going to be ultimately
6 the responsibility of Arctic Gas management. What
7 mechanism are you contemplating to resolve disputes
8 that occur in the field, for example between con-
9 struction people and en_vironmentalists, or perhaps
10 between en_vironmentalists and socio-economists?

11 A Well, we will have a
12 senior CAGSL representative on each spread, each
13 construction spread, and he will be the man in charge
14 in the field itself, wrestling with the very problems
15 that you're discussing. But in these various dis-
16 ciplines to the extent that they can't be resolved in
17 the field, then the individual disciplines and the
18 CAGSL representative or senior man in the field will
19 have to have the matter reviewed by someone more
20 senior back in the head office before a decision is
21 made. I think in, you know, in most cases the
22 problems will be solved in the field by the various
23 disciplines in consultation one with the other, to
24 come up with the solutions. Where they can't, we will
25 not give the authority of the man in the field to
26 just simply ride or to just make a decision, let's
27 say if the environmental group felt strongly and
28 could not agree on the change that was to be made,
29 that man in my opinion would not have the authority
30 on his own to over-ride them. A matter such as that

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1 would have to be reported back to the head office
2 for consideration and resolved there. Now, in addition
3 to the resolutions that Arctic Gas may have, there
4 may well be, probably would be a regulatory agency
5 involved in those same discussions, I would think with
6 input into the resolution of problems that were major
7 or difficult.

8 Q Well, I'm also concerned
9 about disputes that will arise in the field between,
10 let us say, your socio-economic or environmental team
11 on the one hand, and the construction staff that
12 will be sub-contracted out to somebody else. In that
13 kind of situation, is the Arctic Gas man on the spot
14 going to have the right to resolve the difficulty?

15 A He will if all the
16 disciplines agree.

17 Q Yes.

18 A If he can find a resolu-
19 tion, you know, that's what at least my thinking is
20 on the matter.

21 Q Well, are your contracts
22 going to be written so that he will have the right
23 to impose his view on the working contractors?

24 A Absolutely.

25 Q Yes, and I take it that
26 if it is a dispute that cannot be resolved in the
27 field, for some technical reason, that your man in the
28 field will have the right to order a stop work that
29 will be binding on any construction people or firms.

30 A Yes sir.

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1 Q And you intend to have
2 contracts that assure you that kind of power.

3 A Yes sir. Otherwise our
4 authority becomes meaningless.

5 MR. MARSHALL: Mr. Scott,
6 just to go back, if we can, to your reference to
7 Volume 29, I hadn't really thought that we had
8 undertaken or been asked to undertake to provide a
9 complete breakdown of all types of inspectors and
10 so on, and the reference that you have led me to
11 in the transcript, I think discussion with Dr. Clark's
12 panel about geotechnical inspection, you asked him
13 for an estimate of the number of qualified geotech-
14 nical engineers he thought would be working on the
15 pipeline. Dr. Clark said,

16 "We are working on that and we'll have that
17 information to you, I hope, very soon."

18 Perhaps there are other references that I've missed
19 in my review of the transcript that would lead to
20 these other areas that you're interested in.

21 MR. SCOTT: Mr. Commissioner,
22 Mr. Marshall may be right that the reference at page
23 3630 relates only to geotechnical engineers and
24 other inspectors. I would hope, as it's now clear
25 that there will be environmental and socio-economic
26 persons and other inspectors in the field, that if
27 he hasn't undertaken to do so he might perhaps now
28 undertake to let us know what disciplines are going
29 to be represented in this force. Is that possible,
30 Mr. Marshall?

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1 Well, you have caught me
2 out. Can you help me by providing that?

3 MR. MARSHALL: We
4 would be happy to check that for you.

5 MR. SCOTT: Thank you.

6 Q Mr. Horte, I don't
7 say this critically, but rather in complementary
8 fashion, I take it that the proposal that
9 you recommend or that you are talking about which
10 would give Arctic Gas the kind of control in the
11 field that you have described is a novelty in construc-
12 tion in this country.

13 A Well, novelty maybe in
14 the sense that I think it probably will go futher
15 than is the normal situation, but I wouldn't want
16 you to get the impression that companies operating
17 don't carry out fully their responsibilities in
18 connection with construction and supervise it and
19 make sure that the job is being done by whoever
20 is doing it and the manner that it is supposed to
21 be done.

22 Now, here I think you
23 have a more complex situation which makes it imperative
24 that you have more disciplines involved and a
25 tighter control situation.

26 Q Well, the geotechnical
27 panel outlined for the Inquiry the range of solutions
28 that they saw as being available to deal with
29 anticipated problems in the field and I think almost
30 all the members of that panel were confident of their

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1 solutions, but also recognized generally the
2 relative novelty in this country of this project and
3 to a certain extent the lack of precedent, not only
4 in design but in Arctic construction, do you
5 contemplate apart from monitoring any particular
6 measures designed to check the adequacy of your
7 design and construction techniques in the field
8 or are you simply going to content yourself
9 with monitors?

10 A Well, you know, I
11 wouldn't look at these people as just being monitors.
12 They are going to be professional people and I
13 don't think will operate any differently up
14 here than anywhere else and that is if you have an
15 engineer on the job or a geotechnical person or
16 any man with that expertise and he runs into a
17 situation where in his opinion, notwithstanding
18 all the predetermined design, etc., that under
19 a particular situation, that would not be as
20 good a design or as safe a design or as suitable
21 a design as something else that he has in
22 mind under the particular circumstances then
23 we would certainly -- I feel confident that we
24 would, under those circumstances, if we agreed with
25 that man, change the design and we are certainly
26 not, it is not the intention of this group or I think
27 anybody constructing something to say that well,
28 because we designed it precisely that way, regardless
29 of what we run into, we are nevertheless going to
30 carry right on. You are going to make modifications.

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1 -- Modifications that are improvements upon your
2 design as you construct the project, there is no
3 doubt about that in my mind.

4 Q Well, Dr. Hardy told us
5 that the 800 or 900 geotechnical monitors or advisors
6 or watchdogs or whatever --

7 A I can't beleive that
8 he said that just about geotechnical people -- I just
9 can't see that many on the --

10 MR. MARSHALL: He was talking
11 about N.E.S. estimates --

12 MR. SCOTT: We will leave
13 the numbers aside, it doesn't trouble me at the
14 moment. Dr. Hardy told me that the geotechnical
15 advisors of monitors would be persons who are
16 either now at N.E.S. associated with the
17 project or alternatively would be persons who were
18 trained or introduced to the project by its designers,
19 that is the present N.E.S. people and I take it that
20 you accept that general approach.

21 A Yes.

22 Q Yes. Do you think
23 that there is any virture from the standpoint of the
24 public and from the standpoint of the applicant of
25 a machinery in which a fresh group are able to
26 analyse the design both in the office and if necessary
27 in the field?

28 A No.

29 Q Why not?

30 A Because I think unless

1 a fresh -- you bring a fresh group into something
2 and I think you are looking at a long process of
3 their really recognizing everything that a group
4 that has been studying something and really dug
5 their teeth into it for years has come
6 up with and I think all you would get is a great
7 deal of time wastage and in the final analysis come
8 right back to where you were.

9 Q Well, the highly
10 skilled professionals that we heard on the panels
11 are obviously confident of their work and committed
12 to the project and I have no doubt will do
13 their very best.

14 Is there not some virtue
15 at final design to having and I think it is not
16 uncommon in the industry -- a Board of Review that
17 will be hired for this specific purpose of
18 looking for weaknesses or flaws or finding
19 something wrong in the scheme, ⁱⁿ its design components?

20 A I think we will spend
21 months at that before the National Energy Board,
22 sir.

23 Q Well, do you foresee that
24 the National Energy Board is going to provide that
25 function for you?

26 A That is their function,
27 sir, to approve designs in my understanding with
28 respect to pipelines in Canada.

29 Q Well, are you aware
30 for example that British Columbia Hydro for some years

1 in their Columbia River development projects, have
2 of
3 had a Board of Review/independent outside people
4 that come in not only at, but before final design
5 and review the work of the staff and the staff's
6 experts to see if an outside view and an independent
7 view may shed some light on potential problem areas.
8

9 A But do they go --
10 that is a government agency --

11 Q Yes.

12 A And do they go --
13 who is constructing it? And therefore they really
14 haven't outside of that method that you suggest,
15 any input into that, otherwise they just barrel
16 ahead, in other words, I don't understand that
17 they go through the public hearing process and
18 have their designs, etc., reviewed by a Board
19 or a monitoring agency of expertise who questions
20 and changes or modifies what they come up with in
21 the first instance. You know, how many times
22 are you going to go through this process is
23 my problem.

24 Q I understand your
25 concern about that.

26 A I may be all wrong.
27 I just assume that was the case of B.C. -- one of the
28 reasons that they may have done, that, I don't know.

29 Q Having been at the exercise now for some months, I am not entirely confident
30 about the ability of strangers with relatively

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1 limited access to make fundamental meaningful
2 critique of your geotechnical design and I just
3 thought that perhaps you might consider it useful
4 because you want to build the best pipeline for
5 the money, if there were an independent Board
6 of competent experts, fresh blood that came in
7 and looked at final design.

8 A I don't sir, I think
9 we have got the best you can find, advising
10 us right now.

11 Q Are you aware that Syn-
12 crude has indicated that it proposes to do this
13 with respect to its project?

14 A No, I am not aware
15 of that, sir.

16 THE COMMISSIONER: Now,
17 what you are talking about is this, that Arctic
18 Gas would invite a group of engineers of impeccable
19 reputation -- I shouldn't say impeccable reputation
20 -- with first class reputations to come in and
21 examine their proposals for final design and so on.
22 That is what is done at Hydro and what you say
23 is done at Syncrude -- is being done at Syncrude.

24 MR. SCOTT: Proposals.
25 I am not sure that they are at the stage where
26 it would be done yet.

27 THE COMMISSIONER: I see.
28 Nothing to do with Government regulatory authority
29 at all.

30 MR. SCOTT: No.

1 Q What is your
2 feeling about that kind of approach? Before
3 you answer could I ask you one question . Would
4 you consider that a useful technique in a project of
5 this type if there were no National Energy Board?

6 A Well, you know, what
7 you are really saying, you hire one group and then
8 you go and hire another group to check that group.
9 We think with the poeple that we have, we feel con-
10 fident in -- confident enough, let's say in the
11 work that has been done, as management of this
12 project, that we do not see the necessity for
13 bringing in such a group.

14 Q You recognize,
15 I have no doubt, the phenomena, by which an
16 expert quite professionally develops a kind of
17 commitment to a project which after working on
18 it for two years, causes him some difficulty in
19 making fundamental criticisms about matters
20 he has approved a year and a half before.

21 A If that is so, we
22 have not found it, sir.

23 Q I see. You don't think
24 it would be useful to have a small group that were
25 hired specifically for the purpose of finding
26 defects.

27 A I don't.

28 THE COMMISSIONER: What
29 you are saying is that you see no need for Arctic
30 Gas on its own to go out and obtain a second opinion?

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1 A No, sir, we don't.

2 We have confidence in the opinions that we are getting.

3 MR. SCOTT:

4 Q Yes, and that would
5 be so even if there were no National Energy Board?

6 A Yes, sir.

7 Q And I take it that in
8 this case your confidence that you can do without
9 it is bolstered by the fact that there is a
10 National Energy Board?

11 A Well, you know it isn't
12 just the National Energy Board. You know, when
13 you go out to raise the capital that we are
14 going to have to raise -- I don't know whether you
15 have ever experienced this --

16 THE COMMISSIONER: Not
17 often I don't suppose. --

18 (LAUGHTER)

19 MR. SCOTT: The capital
20 raising business is all in Ottawa. I don't know about
21 the great markets of the world.

22 A But I can tell you
23 that the scrutiny in these areas is pretty
24 tremendous. People just don't go putting up
25 \$4 or \$5 billion without having confidence in
26 the engineering work and the feasibility of that
27 project and in many instances they go out and get second
28 opinions before they proceed with financing, etc.

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1 A I can tell you once
2 that in my experience once you get the money you can
3 feel pretty confident.

4 Q Well, I'm quite certain.
5 I bow to your experience that once having received
6 the money, that is some kind of indication that your
7 project is in engineering terms a sound one. That,
8 frankly, wasn't the area in which I was particularly
9 concerned. I'm sure you can build a pipeline that
10 can get gas from Mackenzie Delta to the Alberta border.
11 What concerns me is that the geotechnical aspects of
12 it might benefit from a Board hired by you of
13 independent experts not connected with any governmental
14 agency to give it a second look from an environmental
15 point of view.

16 A I think we've had a lot
17 of second looks at everything, sir, and I just come
18 back to the answer I've already given you.

19 THE COMMISSIONER: Do you
20 feel that the Canadian consultants you've hired, such
21 as N.E.S., are the best people you could get an
22 opinion from, in any event?

23 A We do, sir.

24 MR. SCOTT: Q Well now, Mr.
25 Horte, I take it that one of the areas in which you
26 will be getting advice from Northcan is with respect
27 to appropriate terms for contracts between an Arctic
28 Gas and contractors.

29 A We're asking their
30 recommendations in this regard and we're certainly

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1 giving it a great deal of thought ourselves, and out
2 of that will come a decision by us as to how we intend
3 to go about that.

4 Q And I take it that
5 from the point of view of Arctic Gas -- and perhaps
6 you've already said this -- the characteristics of
7 contracts must include the following. There must be
8 something in the first place that will limit the
9 financial burden on the owner. You've got to keep
10 costs within what you've told your investors they
11 are likely to be, if possible.

12 A Yes.

13 Q So the contract has to
14 be drafted, no doubt from your point of view, with
15 that kind of consideration in mind.

16 A Well certainly, they will
17 be contracting to undertake certain work, and we
18 will be expecting that that work can be accomplished
19 within certain time periods. Now the thing that we
20 feel is that we have to have a situation where we
21 have control of that contractor, and that's why I
22 don't think we'll go the turn-key route where he
23 says, "I'll do it for such and such a price."

24 Because well, two reasons:

25 (1) in the unknown areas, etc., I think the bids
26 would come in extremely high to cover every possible
27 contingency he could ever think of. But just as
28 important as that feature would be the fact of having
29 undertaken to do it at a certain price, if he run
30 into difficulties, you know, then there is a great

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1 tendency to maybe not do the job, I suppose, as
2 adequately as it might otherwise be done because he's
3 worried about the fact that he may lose money, if he
4 doesn't get it completed in a certain period of
5 time, so that under those circumstances we think the
6 best way to go -- and I'm talking about the northern
7 areas -- in the southern more conventional areas,
8 I don't know, we may not go the same route there.
9 It may be more advantageous to go the turn-key type
10 route where you're doing it in a normal construction
11 area where everybody understands what they're doing.
12 In the northern area I think that you have to cover
13 that contractor's costs, whatever they are, so that
14 he's not going in there and lose money, and there
15 has to be a fee in addition to that cost to make it
16 attractive for him to do the work.

17 Now under that arrangement
18 obviously slowdowns and things or cut-backs become a
19 cost of the owner, and not a cost to the contractor.
20 Thereby you exercise a great deal of control as to
21 how that particular job is going to be done. Now
22 there may well be, so that the contractor, if it's a
23 cost plus or fixed fee situation, doesn't really
24 get with it, there may be targets set under the
25 contract and if certain targets are met that there
26 are bonuses for doing that; if they are not met, there
27 are disincentives for doing it. These are the things
28 that we are considering. That aspect being one of
29 trying to control what the cost of the project will
30 be, so those are the considerations and developing

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1 a contract which will in fact do that.

2 Q

2 A second characteristic
3 of the contract is one that you've given me, and that
4 is that it must not impose an unfair financial burden
5 on the contractor. There has to be room to allow him
6 the freedom to do the work properly, and earn a
7 reasonable profit.

8 A Yes.

9 Q And the third character-

10 istic, and perhaps it's one that you've already
11 emphasized, is that the contractual obligations have
12 to be flexible so that Arctic Gas can make the
13 required alterations, if any there be, without imposing
14 any penalty on the contractor.

15 A Yes.

16 Q And I take it there-

17 fore that what you come down to is this, that you're
18 telling us that the contracts in all probability are
19 going to be cost plus.

20 A That will be one feature
21 of them, yes, I think.

22 Q And the next question

23 becomes fixed fee or cost percentage fee, and I take
24 it that you see difficulties in the fixed fee system
25 because it again may bring pressure to bear unfairly
26 on contractors who are working for you.

27 A Well, I really have --

28 it would be improper for me to try and comment on
29 the fixed fee versus percentage fee concept. Our
30 thinking has not developed sufficiently in that

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1 area to give you an indication of which of those two
2 we would prefer. That's something that's being
3 looked into.

4 Q Do you agree with me
5 that the target price, cost plus target price mode
6 with disincentives restores in some cases the kind
7 of burdens on the contractor that you were describing
8 when he said he might take short-cuts in order to
9 get his work done?

10 A It has that tendency,
11 sir, unless the contract provides for the specific
12 rights of the owner to really control that segment of
13 construction in terms of stoppages, etc. etc.

14 Q I understand, and
15 perhaps you agree, that Alyeska has gone to cost plus
16 percentage fee, is that your understanding?

17 A That is my understanding.

18 Q Have you any judgment
19 --

20 A I don't know whether
21 that includes incentives or disincentives, I just
22 have not seen their contract so --

23 Q Would you agree with me
24 that probably one of the reasons an owner goes to cost
25 plus percentage fee has to do with the -- with two
26 factors, the uncertainty in design and construction
27 techniques, the novelty of the project on the one
28 hand, and secondly, the uncertainties that result from
29 any kind of outside control?

30 A Yes, I think even within

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1 that you could bid it the other way, but as I men-
2 tioned I think you would get astronomical prices.

3 Q Have your people done
4 analysis of whether the Alyeska contract approach has
5 produced the desired flexibility and produced a reason-
6 able level with respect to the other factors that
7 you've outlined for us as being at stake in contracting?

8 A No sir.

9 Q Do you think it would
10 be useful to do that?

11 A Well, you know, I think
12 it would be useful, certainly, and we hope to benefit
13 from their experience. I think it's probably far too
14 early for any experience in that regard to be meaning-
15 ful at this stage. You know, they're really just
16 getting under way. I don't really think you have
17 much alternative, though, frankly, than to go a cost
18 plus some form of fee basis in constructing pipelines.

19 Q Some form of percentage
20 fee?

21 A No, I said some form of
22 fee basis, I didn't say percentage.

23 Q You're not ready yet
24 to make that decision?

25 A No.

26 Q Have you given any
27 consideration to doing what I understand Alyeska has
28 done, and that is purchasing the construction equip-
29 ment necessary for the project yourselves?

30 A It's a consideration,

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1 we have not made any decision in that regard.

2 Q Could you just list for
3 me in point form the advantages and disadvantages
4 -- you can leave cost out perhaps -- in making that
5 decision?

6 A Well, I don't know that
7 I'm -- I can give you some of them but there are many
8 many others, which other people could answer better
9 than I can. One of the advantages, of course, is
10 that it may be in the acquisition of the equipment
11 itself in that by buying in large numbers, there would
12 be some economic advantage to that and you would be
13 sure of the scheduling of that equipment, as compared
14 to individual contractors going all to different
15 suppliers, one trying to get ahead of the other, etc.
16 in the lineup for the machinery. Now that doesn't
17 mean that you couldn't buy the machinery in the
18 manner that I have mentioned, and then turn it over
19 to the contractors.

20 Another possible advantage
21 of the machinery being owned by the pipeline company
22 might be in the -- in being able to move that machinery
23 around from place to place more readily if it's under
24 your control rather than under the control of the
25 individual contractors, in other words if you get
26 behind on one spread and have to add to another spread
27 you might have greater flexibility in this area than
28 you would the other way.
29
30

V.L. Horte
CROSS-Exam by Scott

Some of the disadvantages that occur to me and I don't know that I have covered nearly all of the advantages, but some of the disadvantages that I know have been discussed and therefore occur to me are that, you know, if the contractor does not own the machinery, does he have the same responsibility with respect to the use of that machinery. In other words, are you sort of ripping up machinery right and left because it really does not matter to him as such. If he is an owner of that machinery, maybe better care is taken of that machinery. That is one of the potential disadvantages -- I am sure that there are others, sir, and I am no expert on machinery, but these are some of the considerations at least that are in our thinking at the present time. We have not reached a decision.

Q Have you formed any policy or made any judgment as to the extent to which Canadian contractors will be used on the project. This isn't an invitation to wave Mr. Gibbs' flag -- it's just that I want to know whether you have a policy or whether you formed a judgment about this.

A Yes, certainly our policy, not only with respect to contractors, but as you know with respect to ^{materials,} personnel and everything else is to get the maximum Canadian content consistent with it being reasonably priced and competitive.

Q Have you done any

1 studies to ascertain the affect that this will have
2 on the Canadian pipeline construction industry in
3 terms of its availability to perform other projects
4 over the three years when you are building this
5 pipeline?

6 A Well, I think a very
7 beneficial effect -- that industry right now
8 is suffering a great deal in Canada and has been
9 for the last few years because pipeline construction
10 is really down. --And, you know, you look at the
11 scene of where we are going to get our energy
12 from and you relate that to pipeline contracting
13 and unless we do develop these resources in the
14 North, you cannot really see a great deal of pipeline
15 contracting to the degree that it has taken place
16 in the past, continuing to take place from the
17 areas that it normally -- in the areas that it has
18 normally occurred.

19 Q Well, that is
20 your policy. But have you formed ^{any} judgment or done
21 any work to determine whether the application
22 of this policy is going to overburden or overstretch
23 the construction industry in the country so that
24 it is not available at reasonable price to do --
25 to perform other jobs.

26 A Not really, but I would
27 be surprised if it would overstretch it in terms
28 of big inch construction spreads, because I don't
29 know where else they are going to go.

30 Q Well now --

V.L. Horte
Cross-Exam by Mr. Scott
CR

1 A Many of them right
2 now are working outside of the country because there
3 just isn't work inside the country.

4 Q Do you see some necessity
5 for developing a -- perhaps with the assistance
6 of Northcan, -- a code to measure the capacity
7 of contractors to carry out your work, to supervise
8 it and to assure its quality?

9 A I don't know what you
10 mean by a "code", sir.

11 Q I beg your pardon?

12 A I don't understand what
13 you mean by a "code."

14 Q Well, you have
15 made it perfectly clear that the project
16 has some relatively unique characteristics and
17 their considerations involved in the course of
18 construction and in the course of design that
19 won't normally occur in other southern projects and
20 what I am concerned about is how are you going
21 to measure the capacity of potential contractors
22 to do the work for you efficiently and well?

23 A I think just like you always
24 measure that capacity. You look at their past experi-
25 ence, what they have done, and in particular the key
26 personnel that they have and their experience to
27 manage and handle the full construction spread and
28 it is from an evaluation of that that you select
29 those people that you think are capable of doing
30 it in the first instance and you go out to bid with

V.L. Horte
Cross-Exam by Scott

1 those -- with those spreads. You eliminate those
2 that you don't think are capable of it in the
3 first instance along the lines that I have just
4 said, and then of course the assurance that they
5 will perform in a manner that they have to or
6 undertake will be a contractual arrangement.

7 Q Well, is that judgment
8 as to the capacity of contractors going to be made
9 by Arctic Gas or is it going to be made on the recommen-
10 dation of some advisor and approved by Arctic Gas?

11 In other words, is
12 Northcan going to do this? Is N.E.S. going to
13 do this? Or is Arctic Gas going to do this?

14 A No one in particular.
15 We are going to take everybody's advice, but
16 certainly a great deal of that input will come
17 from our own experienced people. -- I mean that the
18 availability of spreads and the people that do this
19 work are well known to us in the industry. It isn't
20 going to be a big job to determine who has got the
21 capability or hasn't. We already know those sort
22 of things.

23 THE COMMISSIONER: They
24 all belong to Northcan, don't they?

25 A No, sir.

26 THE COMMISSIONER: Oh, I
27 thought -- I am sorry, I thought I heard the name
28 Bannister as one of the --

29 A That is one, just one.

30 MR. SCOTT:

V.L. Horte
Cross-Exam by Scott

1 Q Well, that brings us to
2 another subject. Isn't it relatively obvious that
3 a fair amount of the construction work is going to
4 be done by firms that you have already hired as
5 consultants, like Bannister, who are participants
6 in Northcan? I am not saying that you are going
7 to hire Bannister, but that pool of expertise is
8 going to provide a substantial number of your con-
9 tractors.

10 A No, in the Northcan
11 group, the only one in there that operates in
12 Canada at the present time to my knowledge is
13 Bannister -- in terms of constructing --
14 having construction spreads -- N.E.S. doesn't,
15 Bow Valley Industries doesn't, Acres doesn't,
16 there are only two there. -- And the only one in
17 Canada is Bannister and the other one is
18 Santa Fe that does construction work in the U.S.

19 Q Well, let me put
20 it this way, in the event that Bannister bids for a
21 contract to build the pipeline, is it going too
22 far to say that you aren't going to pay any attention
23 to the advice of Northcan on who should get the
24 contract?

25 A I would think certainly
26 in that instance we wouldn't. I don't think that we
27 will be depending on the advice of Northcan in
28 any event as to who should get the contract, if
29 you want my opinion. We will be evaluating that
30 very much ourselves.

1 Q All right, that is what
2 I wanted, the decision is going to be made by Arctic Gas
3 in the real sense -- it is not simply going to be
4 approved by Arctic Gas, it is going to be made
5 by Arctic Gas?

6 A Absolutely.

7 Q Now, have you given any
8 thought in terms of these contractors to establishing
9 requirements that will assure that they have the
10 staff available to deal with the special environmental
11 problems that will be found constructing in the
12 north?

13 A We will very definitely
14 take that into consideration.

15 Q How are you going to
16 do that?

17 A They may well not have
18 the staffs, and -- in certain of these areas and
19 they may have to obtain them, but in that area,
20 specifically, we are going to be there.
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V. L. Horte
Cross Exam by Scott

1 On the jobs ourselves, and our contractual arrangement
2 is going to be such that we are going to be responsible
3 in that area.

4 Q So would it be fair
5 to say then, at the contractors supervisory level, or
6 advise level, you will be building into your contracts,
7 the right to in effect inspect their staff, and make
8 certain that they meet your standards?

9 A Well, I think that
10 when we select the contractor like you normally do, or
11 quite often you do is that there are key people that
12 the contractor will put forward as being the men that
13 he will have in charge of that particular spread or
14 piece of construction.

15 And we will want to be
16 assured, first of all, you normally review -- you
17 review the lead people that will be involved to be
18 satisfied that in fact they have the capability etc.
19 of performing the job.

20 Now, you don't carry that
21 all the way down the line, but you want to make sure
22 that the men in charge are very capable and experienced
23 men. And that is part and parcel of accepting a
24 contractor to do any job.

25 Q Well, that I would
26 guess is part and parcel of the act of selecting a
27 given contractor. He's got certain key men you know
28 are good before you select him.

29 A Not only that, you'll
30 undertake to have him on the job.

V. L. Horte

Cross Exam by Scott

1 Q All right. So that
2 your contractors will assure that you have a continuing
3 control over the kind of supervisory and senior
4 personnel that these contractors have?

5 A I'm sure we'll have
6 that-- be able to exercise that control, yes.

7 Q Well, now, there is
8 one other short area. In the prepared evidence on page
9 15, you state, and I am quoting, " that engineering and
10 environmental considerations can be reduced to hard,
11 in the sense of quantifiable technical inputs into
12 decision making." And I understand that to mean that
13 there are standards by which you can measure the inputs
14 in an engineering aspect and weigh them one against the
15 other in order to judge which is more or less
16 important?

17 A Yes.

18 Q Yes, well, now, in
19 Mr. Dau's testimony dealing with the environmental
20 inputs, beginning at page 2098 he describes the
21 process by which environmental modifications were made
22 with respect to route and I think, on four occasions,
23 with respect to design. And he says that he knew of
24 no way of quantifying environmental considerations
25 and was given no guidelines as to how to do that.
26 Do you accept that statement, as far as you know,
27 as being correct?

28 A Of really quantifying
29 it, it becomes more of a relative thing in that
30 area. If you want me to put in order of being able

V.L. Horte
Cross-Exam by Scott

1 to quantify something when you're talking about
2 engineering matters, en_vironmen_tal matters, and
3 sociological matters, I'd have to put engineering
4 at the top of the list as something you can quantify,
5 and to a lesser degree, environmental, and to a still
6 lesser degree, sociological considerations. That's
7 my opinion.

8 Q Let me just read what
9 Mr. Dau says at page 2099, question 10:

10 "Q Yes. How did you measure those two com-
11 peting interests?"

12 And I'd given him an example of birds as opposed to
13 caribou on the North Shore.

14 " How did you measure those two competing
15 interests off against each other?

16 A I was going to respond by saying 'With
17 difficulty,' but it is --

18 Q I suggest to you, Mr. Dau, it was
19 impossible.

20 A Yes, it is a compromise. There is no
21 way that I could put a value on a
22 Peregrine falcon. I obviously cannot.

23 Q Yes, it is impossible, is it not?

24 A That is correct."

25 And then further down at line 27:

26 "Q Yes, and you were given and had no
27 scale of values or priorities that
28 could be attached to any of these
29 considerations."

30 And then a line is missing, but then I go on to say,

V.L. Horte
Cross-Exam by Scott

1 " You were about as useful in that situation
2 as a lawyer would be, is that not so?"
3 And then Mr. Marshall accused me of insulting Mr. Dau,
4 and then I go on:

5 " Leaving personalities aside, Mr. Dau,
6 that would be fair, would it not?

7 A That would probably be fair, sir.
8 Yes, and your client, Arctic Gas, was
9 unable or did not give you any scale
10 such as that to assist you?

11 A I received no such instructions."

12 A I would agree with that.

13 Q Well now, was any con-
14 sideration -- well, before we get to that, were you
15 aware of a number of studies that have been done that
16 in which techniques have been devised to do precisely
17 that, that is to value environmental considerations
18 one against the other?

19 A No, I am sure that's
20 been attempted, if you want an opinion I don't know
21 how you'd go about that. How do you evaluate a peregrine
22 falcon, versus a snow goose, versus a grizzly bear
23 versus muskrats? You name it, I just don't know how
24 you do that.

25 Q It would be very helpful
26 in route selection and design if that could be done,
27 wouldn't it?

28 A It would if you could
29 just put numbers on these things, it would, but it
30 isn't that sort of a -- that isn't the situation you're

V.L. Horte
Cross-Exam by Scott

1 faced with,

2 Q Are you aware or do you
3 know if Arctic Gas is aware of the work of Leopold
4 reported in the U.S. Geological Survey, where pre-
5 cisely that has been done by him?

6 A I am not, I'm sure.

7 Q Were you aware or was
8 Arctic Gas aware of the work done by Dr. Pierce at
9 the University of British Columbia where he has
10 established a scheme to quantify environmental
11 concerns?

12 A I am not aware of it
13 but that doesn't mean that Arctic Gas is not aware of
14 it.

15 Q Were you aware of the
16 papers which had been prepared by Professor Davies
17 and Fisher detailing the attempt that was made to
18 do this with respect to the deep harbour project at
19 Lornville, New Brunswick?

20 A I'm not aware of that,
21 sir. Same answer as the last one, Arctic Gas may be.

22 Q I take it therefore that
23 as far as you know, no study was made to attempt to
24 quantify these considerations.

25 A I'm sure that is true.

26 MR. SCOTT: Mr. Commissioner,
27 I'm prepared to proceed longer, but it's one o'clock.
28 Do you want me to?

29 THE COMMISSIONER: How much
30 longer will you be?

V.L. Horte
Cross-Exam by Scott

1 MR. SCOTT: I have about
2 2 1/2 hours.

3 THE COMMISSIONER: I don't
4 see how we can finish today.

5 MR. SCOTT: I told Mr. Marshall
6 earlier that I didn't think I could.

7 THE COMMISSIONER: Well, I
8 think we might as well adjourn now then.

9 Sorry, Mr. Horte, that
10 means we have to see you again perhaps sometime in
11 July. I am sure it will be worked out to a time
12 convenient to you.

13 Well, I think we will adjourn
14 now then for the day. What -- just having caught
15 during the coffee break and from Mr. Scott some
16 comments about the schedulling for July, I am inclined
17 to think that subject to what you may say, that we
18 should try to reconvene on Friday, July 18th, sit
19 Friday, July 18th and Saturday, July 19th, the
20 morning and afternoon on both days, then start in
21 again on Monday, July 21st and go right through to
22 Saturday, six days, sitting morning and afternoon
23 on each day, and then we will take the week of July
24 28th off. I think that may be the best way to handle
25 this and we would get the equivalent of two weeks in.

26 I think Mr. Marshall and
27 you, Mr. Hollingworth, are probably the people most
28 concerned. Do you have any comment on that?

29 M R. MARSHALL: That would
30 be suitable for us, sir.

1 THE COMMISSIONER: Mr.

2 Hollingworth? I know you're there.

3 MR. HOLLINGWORTH: I was much
4 happier with the alternate suggestion that was made,
5 starting with the whole week on the 21st, going the
6 six days that week and finishing off with a few
7 days in the remaining week, sir.

8 THE COMMISSIONER: The trouble
9 with that is that even if I can survive it, some of
10 the members of the Inquiry staff and the Court reporters
11 -- I think it's better for them to have a break of
12 a week.

13 MR. HOLLINGWORTH: I certainly
14 see the problem. It's beginning to look as if, from
15 our point of view, that we're in the situation of
16 having Mr. Horte finish off and then having a very,
17 very brief time to put in some evidence in chief
18 and then have to break for a day and then come back.

19 THE COMMISSIONER: Well, I
20 think --

21 MR. HOLLINGWORTH: That's why
22 I indicated a preference for the other.

23 THE COMMISSIONER: Well, I
24 think we will leave it to Mr. Scott, Mr. Marshall and
25 you to work that out. We will be continuing with
26 Phase 1 then, and beside the evidence that Foothills
27 may wish to call, it may be that Canadian Arctic
28 Resources Committee, the native organizations, and
29 Commission counsel may want to call evidence and
30 they may be able to accommodate you, but I think we

1 really have to take that week of July 28th off.
2 You see, a lot of the people don't live here in
3 Yellowknife. They are away from home and during the
4 summer I think they want that week. In August it
5 looks like we'll sit all four weeks in August. So
6 we will adjourn then until -- the formal hearings
7 are adjourned until Friday, July 18th, at 9 A.M.
8 here in Yellowknife, and the Inquiry itself will
9 adjourn until Tuesday, June 24th, when we hold a
10 community hearing in Fort Franklin, and I hope no
11 one is going to ask me what time of day it will
12 begin. I'd say something in the afternoon.

13 So we'll adjourn then.

14 (PROCEEDINGS ADJOURNED TO JULY 18, 1975)
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Canada. National
Energy Board.

Mackenzie valley pipeline
inquiry:
6 June 1975
Vol.50

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MACKENZIE VALLEY PIPELINE INQUIRY

Government
Publication

IN THE MATTER OF AN APPLICATION BY CANADIAN ARCTIC
GAS PIPELINE LIMITED FOR A RIGHT-OF-WAY THAT MIGHT
BE GRANTED ACROSS CROWN LANDS WITHIN THE YUKON
TERRITORY AND THE NORTHWEST TERRITORIES FOR THE
PURPOSE OF THE PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Whitehorse, Y.T.

August 11, 1975.

PROCEEDINGS AT INQUIRY

Volume 51

CANADIAN ARCTIC
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APPEARANCES:

Ian Scott, Esq., Q.C.,
S.T. Goudge, Esq., & appear for Commission;
D. Carter, Esq.,
J.J. Marshall, Esq., appears for Canadian Arctic Gas
Pipeline Limited;
R.G. Gibbs, Esq., and
Mr. Hollingworth appear for Fooghills Pipelines;
R. Veale, Esq., appears for Council of Yukon
Indians;
R. Anthony, Esq., appears for Canadian Arctic
Resources Committee;
G.W. Bell, Esq., appears for Indian & Metis
organizations of the Northwest
Territories;
J.U. Bayly, Esq., appears for Inuit Tapirisat of
the Mackenzie Delta.

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1 Whitehorse, Y.T.,

2 August 11, 1975.

3 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

4 THE COMMISSIONER: Well, ladies
5 and gentlemen, I will call the hearing to order this
6 morning. I think that since this is the first occasion
7 on which the Mackenzie Valley Pipeline Inquiry is sitt-
8 ing here in Whitehorse, since we held a Preliminary
9 Hearing in this city last year, that I should explain
10 briefly why we are here and what we are anxious to do
11 this week.

12 The Inquiry was established
13 by order-in-council of the Government of Canada to
14 consider the likely impact there would be in the Yukon
15 and the Northwest Territories if a gas pipeline were
16 built to bring natural gas from the Arctic to markets
17 in the south.

18 Now, two pipeline companies
19 want to build that pipeline, and have applied to the
20 Minister of Indian Affairs & Northern Development for
21 a right-of-way. One of those companies, Arctic Gas,
22 wants to bring gas from Prudhoe Bay in Alaska across
23 the Northern Yukon and there the pipeline would join
24 with a line that would bring gas from the Mackenzie
25 Delta and then the line would go south, that is up
26 the Mackenzie Valley to Alberta and then south to
27 Southern Canada and the United States.

28 Foothills Pipelines, the other
29 pipeline company, wants a right-of-way to transport
30 natural gas from the Mackenzie Delta south up the

1 Mackenzie Valley to connect with the existing Alberta
2 system.

3 Now the Federal Government has
4 issued what are called pipeline guidelines and these
5 require the two companies, Arctic Gas on the one hand
6 and Foothills on the other, to file a comparison of the
7 route they want to take with alternate pipeline routes;
8 and since the alternate routes affect the Yukon Terri-
9 tory and would in fact pass through the Yukon Territory,
10 and through Whitehorse itself, or at least past White-
11 horse might be a better way of putting it, I thought
12 that we should hold this week of hearings to consider
13 these alternate routes here in Whitehorse, the capital
14 of the Yukon Territory.

15 We have already last month
16 held a three-day hearing in Old Crow in the Northern
17 Yukon to find out what the people there had to say
18 about the proposed route across the Northern Yukon.

19 Now this morning we will be
20 hearing from the experts the pipeline companies and
21 others want to give evidence, and these gentlemen on
22 my left are some of the experts that we'll all be
23 hearing from; but tonight at eight o'clock and each
24 night this week at eight o'clock I want to hear from
25 people who live here in Whitehorse and other parts of
26 the Yukon who want to say something about this pipeline
27 proposal, because as concerned Yukoners and concerned
28 Canadians you may wish to speak to me and to tell me
29 what you think the likely impact will be, and to tell
30 me what recommendations you believe I ought to make to

1 the Federal Government in due course if a pipeline is
2 to be built. If you wish to speak tonight at eight
3 o'clock you do not need to have a brief, you do not need
4 to file anything in writing. You can just come here and
5 speak up on your own behalf and no lawyer will be
6 allowed to cross-examine you. You will be simply per-
7 mitted to tell me what you think and you may remain
8 seated when you do so or stand up, whatever you wish.
9 So that when you observe today, these gentlemen on my
10 left giving evidence and a lawyer questioning them,
11 don't think that we're going to put you through that
12 kind of procedure.

13 Now, the routes that we'll be
14 looking at affect really in the first instance at least
15 the movement of gas from Prudhoe Bay and you will see,
16 if you want later on at the coffee break to look at
17 this map, that Arctic Gas' first choice, so to speak, is
18 to move that gas from Prudhoe Bay across the north
19 coast of Alaska and across the Northern Coastal Plain
20 of the Yukon and then down the Mackenzie Valley. Now
21 they have a second choice, they say that "if we are not
22 going to be allowed to bring the gas across the north
23 coast of the Yukon, then we want to bring it by a route
24 through the interior past Old Crow and across the
25 Richardson Mountains to the Mackenzie Delta, and then
26 down the Mackenzie Valley." Yes, that's the interior
27 route that Mr. Williams is marking out. You might mark
28 out the coastal route, Mr. Williams.

29 The Inquiry was in Old Crow
30 last month to hear what the people there had to say

1 about the proposal to bring the gas on the interior
2 route past Old Crow Flats and the Village of Old Crow.

3 Now the alternate routes are
4 the Fairbanks route, which would bring the pipeline
5 south from Prudhoe Bay to the Brooks Range to Fairbanks,
6 parallelling the Trans-Alaska Pipeline that is now
7 under construction, then along the route of the Alaska
8 Highway to Whitehorse. A supply line would bring gas
9 from the Mackenzie Delta south along the proposed route
10 of the Dempster Highway to Dawson and then to Whitehorse,
11 then the trunk line would travel from Whitehorse south-
12 easterly along the route of the Alaska Highway to B.C.
13 and Alberta.

14 Then there is another route,
15 the Fort Yukon route, and that route would bring the
16 gas from Prudhoe Bay south to a place called Oksrukuyik
17 swinging south-east to Fort Yukon in Alaska and then
18 along the Yukon River to Dawson where the supply line
19 from the delta would join it. The trunk line would
20 travel south to Pelly Crossing and Watson Lake and
21 then along the route of the Alaska Highway to B.C. and
22 Alberta.

23 There is another route, Mr.
24 Williams, while you're up there, if you don't mind.
25 It isn't on your map but it is the off-shore route and
26 this route would bring the Prudhoe Bay gas by an under-
27 water gas pipeline along the Arctic coast to the Alaska-
28 Yukon border, and from there it would proceed on the
29 prime route along the north coast of the Yukon and
30 the Northwest Territories to ^{the} Mackenzie Delta, and then

1 up the Mackenzie Valley.

2 There is one other route that
3 isn't on that map either, but I'll mention it because
4 the Inquiry has been asked to consider it, and that is
5 what is called the edge-of-the-shield route that
6 would take the pipeline from the Mackenzie Delta along
7 the edge of the Canadian shield across the barrens to
8 Manitoba and Ontario.

9 Now, the second thing that is
10 of concern to Yukoners is the question of supply routes,
11 and Arctic Gas' proposal to build this pipeline is
12 one that has been described to the Inquiry as the
13 greatest venture ever undertaken by private enterprise,
14 that is in terms of capital expenditure. So that the
15 quantities of equipment, materials and supplies required
16 would be enormous. For instance, 1.9 million tons
17 of material would be transported into Canada north of
18 the 60th Parallel and the largest component by tonnage
19 of the material would be pipe, 1.1 million tons of pipe.

20 So the question arises, by
21 what route or routes is all of this material
22 going to be brought into the north, and without going
23 into the subject in detail I will simply say that it
24 has been suggested to the Inquiry that if the pipe, this
25 vast quantity of pipe were to be purchased in Japan --
26 and I remind you that all of the pipe for the Alyeska
27 line was purchased in Japan -- if the pipe for the
28 proposed Arctic Gas line were to be purchased in Japan
29 one of the supply routes by which it might be brought
30 into the site of construction would be by sea to

Skagway and then by rail or by truck to Whitehorse, and then by truck along the Dempster to the Mackenzie Delta, and to the Arctic coast. Other supply routes from Japan might well take the pipe to Vancouver, then by rail to Hay River and by barge down the Mackenzie River. Another route might take the pipe by sea around the Alaskan Peninsula and along the Arctic coast to the construction sites along the route described as the prime route. Of course, if any of these alternate routes is decided upon, these routes that come through the Yukon itself, through the Southern Yukon, you can see that a great deal of material and equipment would have to be brought through the Yukon.

Well, you people here are entitled to express your views on these matters, certainly to listen to what these experts have to say, and then to express your views tonight at eight o'clock, and eight o'clock each night this week as long as we are here, and I have taken the trouble to go through this rather long explanation of why we are here so that you will have some understanding of what is to follow.

Bear in mind, though, that tonight at ^{the} community hearing you don't have to restrict yourself to alternate routes or supply routes. You can discuss any social, economic, or environmental aspect of this pipeline that you want to, and I hope that you will not feel fettered in any way by the fact that the experts today and for the rest of the week will be confining themselves to these very special issues. You may deal with any aspect of pipeline construction, any

1 aspect of the impact that a pipeline would have in
2 all of its ramifications here in Northern Canada.

3 So having said all of that,
4 I am pleased that the Commissioner of the Yukon Terri-
5 tory, Mr. Smith, has been good enough to join us this
6 morning, and I'll call on Mr. Smith now. Mr. Smith?

7 COMMISSIONER SMITH: Thank
8 you very much. It is my pleasure, Mr. Justice Berger,
9 to welcome you and the members of the Mackenzie
10 Valley Pipeline Inquiry to Whitehorse on behalf of the
11 Government of Yukon. We're pleased that the Inquiry
12 is fulfilling a vital role in monitoring the development
13 of the proposed northern pipeline, and providing a
14 forum for public opinion.

15 I was very much encouraged
16 with your opening remarks, sir, and certainly I think
17 that you have clearly indicated the areas of concern
18 that Yukoners generally have.

19 Something that I want to warn
20 you personally on, and that is this morning on a news
21 broadcast one of your staff was referring to you as
22 "The Pipeline Commissioner," and I want to tell you,
23 sir, that the word or the title "Commissioner" hardly
24 meets with total public approbation north of the 60th
25 Parallel, and I strongly recommend that when you are
26 wandering around, particularly in the Yukon, that you
27 refer to yourself as Mr. Justice Berger. I think that
28 would be much safer. The connotations of the use of
29 the word "Commissioner" go into a lot of onerous and
30 sometimes rather bad detail that I'm sure you don't

1 want to have associated with the particular task that
2 you have on hand. It's bad enough that my friend,
3 Hodgson and myself, bear that on behalf of the Federal
4 Government at the present time.

5 Yukoners are naturally con-
6 cerned with the future development of the north and
7 the role that they will play in this process, and
8 therefore may I take this opportunity to outline cer-
9 tain concerns that we as the government regard as
10 highly important for orderly development.

11 There are several areas of
12 economic development in which a substantial impact
13 would be felt by Yukon citizens, and the results are
14 likely to occur regardless of the route chosen for the
15 pipeline. However, it is obvious that the specific
16 impact on communities would depend upon the route
17 selected.

18 The supply of men and materials
19 to the pipeline would have a significant effect on the
20 transportation systems available in the Yukon, if
21 indeed our transportation systems are to be used. It
22 is our experience from the Alaska Pipeline project
23 that the Yukon Highway system could play a major role
24 in the provision of goods and services to the construc-
25 tion of the pipeline. Such ensuing transportation
26 activity could be expected to have economic and environ-
27 mental implications for Yukon communities, as well
28 social implications for the people. It will also
29 affect the labor market and the stability of prices
30 locally. Large migrations of workers and the resulting

1 impact on local prices would substantially effect the
2 economic structure of the Territory.

3 We therefore request that this
4 Inquiry take account of the impact of this activity and
5 I'm much encouraged by your opening remarks in which you
6 pay specific attention to this.

7 As a deadline for decision
8 approaches, more immediate concerns are becoming evident
9 to the government. The employment of northerners in
10 both the construction and the operational phases of the
11 pipeline should be a prime responsibility for any con-
12 tracting and operating agency. Further, it should be
13 expected that northern enterprises would benefit from
14 any activity, wherever practical and possible to do so.

15 This Inquiry has shown its
16 concern for these problems by communicating with north-
17 erners and compiling information which will allow for
18 responsible decision-making at the appropriate level.
19 It is hoped that the hearings in Whitehorse will con-
20 tinue to exhibit a similar level of communication,
21 with special reference to the analysis of alternate
22 routes and their effects on Yukon communities.

23 Transportation, social and
24 economic problems, and the environment are major con-
25 cerns to Yukoners. It is the intention of my government
26 to provide full support in assisting this Inquiry in
27 conducting its examination of the proposed pipeline.

28 Most Canadians tend to categor-
29 ize the Northwest Territories and Yukon as one big
30 northern area with common needs, backgrounds, and future
aspirations. In actual fact there are several

1 important factors which place the Yukon Territory in
2 a unique situation of its own. Unlike most of the
3 Canadian north, the Yukon Territory has political,
4 economic, transportation and communication structures
5 which go back more than 75 years. As well, there are
6 significant geographic differences between the North-
7 west Territories and Yukon, which have resulted in
8 major differences in resource development and population
9 trends.

10 Yukon has been established as
11 a separate political entity within Canada since 1898 and
12 has had an elected Council since 1908. A strong foun-
13 dation for development has developed during the 75
14 year history of political maturity. Yukoners have a
15 firm understanding of the process of government and
16 the roles that industry and government play in develop-
17 ment. Consequently, they are keenly aware of the
18 impact that a major project such as the proposed pipe-
19 line will have on the structure and the process of
20 government here in Yukon.

21 Yukon has almost the exact
22 opposite of the population structure of the Northwest
23 Territories. About 15% of our population is of direct
24 native descent, and of the remaining 85%, many are
25 third and fourth generation Yukoners with a rich history
26 behind them.

27 Yukon has seen substantial
28 economic development dating back to the Gold Rush days
29 of the 1890's. During this period gold was the
30 primary object of the mining industry's activity. The

1 City of Dawson was the centre of this activity, and
2 developed sub-systems to deal with the influx of
3 people. For example, a hydro-electric plant was built
4 on the north fork of the Klondike River in the early
5 1900's, and this provided power to Dawson and the
6 industrial base of the Yukon Consolidated Gold Corpora-
7 tion until the 1960's. As well, a water-carrying pipe-
8 line was built around the same time to provide water
9 for the commercial dredges and with trenches, flume and
10 pipe, the network covered over 70 miles. The pipe was
11 constructed on the ground of plate that was imported
12 from Europe, and it's still in existence today, being
13 used as part of the utildor system at the Cassiar
14 Asbestos Corporation's operations at their operation
15 just north of Dawson City. It was an engineering and
16 environmental triumph at the time, and taught Yukoners
17 how to cope with this type of massive development in
18 a sensitive environment.

19 More recently, other economic
20 developments have taken place which more clearly re-
21 flect the established economic infra-structure. During
22 the Second World War the Alaska Highway was built, and
23 to supply the fuel needed for the war effort a pipeline
24 was built from Norman Wells to Whitehorse, and through
25 the Territory into Alaska. The Canol Pipeline brought
26 crude oil to Whitehorse, where it was refined for
27 onward distribution. This is an example of the exposure
28 the Yukon residents have had to pipelines over the years.

29 Presently there are a number
30 of minerals being mined throughout the Territory.

1 Exploration activities have become intense in recent
2 years, indicating a strong future for mineral resources.
3 The success of ventures in Yukon is a result of a
4 favorable social structures and services available
5 here to make these things possible, and the progressive
6 attitude of the people is likewise a tremendous plus
7 in this kind of activity.

8 Historical development has
9 provided a strong base for the present-day mineral
10 extraction industry. Yukon has had a railway system
11 since 1900, which provided access to a Pacific port.
12 It has proved to be an efficient means of transporting
13 mining concentrates to market. Since the Second World
14 War we have had a modern highway system, and all
15 settlements throughout the Territory are now connected
16 to this all-weather network, except for the Community
17 of Old Crow.

18 Yukon has had a great deal
19 of experience with many types of communication tech-
20 niques. First the overland telegraph, then the tele-
21 phone, radio, and now satellites have provided communi-
22 cation throughout the area. The people of Yukon have
23 the knowledge and the understanding to use these
24 communicative devices efficiently.

25 These examples are designed
26 to show that Yukoners as Northern Canadians are unique
27 because of their early exposure to economic development.
28 Today, sir, the Yukon's economy is very highly sophisto-
29 cated and an industrially based one. The concern
30 over resource development in the north and its effect

1 on Yukon is based on a firm understanding of the
2 economic, social, and political implications which
3 will accrue to us. The experience gained in dealing
4 with development in the past has given us a strong
5 base for the analysis for any future development. The
6 established infra-structure should be used by outside
7 agencies, as a bank of information.

8 It is vital to recognize that
9 the people of Yukon have had four generations in which
10 to develop and perfect the mechanisms for dealing with
11 present-day resource-type development. We have wel-
12 comed this development in the past and this attitude
13 will continue so long as future development fits into
14 our social, political and economic environment and
15 provide some real benefits to us.

16 We recognize that the heavily
17 populated areas of our continent require some of the
18 vast energy supplies of the north. Pipelines have
19 been a part of Yukon's history, and a familiar compon-
20 ent in our daily lives. We have experienced satisfac-
21 tory developments in the past and have services avail-
22 able which could be expanded to accommodate new devel-
23 opments in the future. A rational pipeline project need
24 not be considered as a negative factor in the develop-
25 ment of Yukon as long as appropriate safeguards are
26 maintained. However, if pipelines are to be built
27 across our Territory, we must reap our fair share of
28 the benefits. We are no longer prepared to act as a
29 resource storehouse only.

30 Yukon is an economic and

1 political reality, and must be treated as such. The
2 separate political and economic history of Yukon makes
3 it imperative that differences between ourselves and the
4 rest of Canada's north be recognized fully by both
5 the Canadian public and the business community. A
6 policy statement by one government does not necessarily
7 reflect the views of the others. Any development in
8 the Yukon must encompass the political and economic
9 aspiration of Yukoners to ensure that they will reap
10 the benefits of any projects such as the pipeline.

11 As part of our opening state-
12 ment to this Inquiry, sir, we would like to submit
13 a map of the transportation facilities existing and
14 proposed that are here available in the Yukon today,
15 and we trust that although your stay in Whitehorse is
16 a short one, this Inquiry will find information which
17 will aid it in the formulation of its final report
18 and once again, I would like to reiterate, sir, our
19 pleasure at having you here and we welcome as a govern-
20 ment any opportunity that may be made available to us
21 to assist you in your deliberations so that when they
22 are completed that it cannot be said that they lacked
23 something because the Yukon was not prepared to
24 participate. Thank you.

25 THE COMMISSIONER: Thank you
26 very much, Mr. Smith. I'm very grateful to you for
27 joining us this morning, and for your very comprehen-
28 sive account of the course development has taken so
29 far in the Yukon. If you would let us have a copy of
30 your remarks, and if you would leave that with Mr.

1 Waddell and the map with him as well, they will be
2 marked as exhibits. Is the map -- well, Miss Hutchinson,
3 perhaps you could just pick up Mr. Smith's remarks and
4 the map and those will be marked as exhibits.

5 (COMMISSIONER SMITH'S REMARKS MARKED EXHIBIT 149)

6 (MAP OF YUKON TRANSPORTATION SYSTEMS MARKED
7 EXHIBIT 149-A)

8 THE COMMISSIONER: When you get
9 a moment, you might see if you can put the map up on
10 the wall.

11 Well, Mr. Scott?

12 MR. SCOTT: All right, I think
13 we're prepared to deal with the evidence that you indi-
14 cated in your preliminary ruling could be called at
15 Whitehorse, and I understand that Arctic Gas -- and I
16 gather Arctic Gas is ready to lead off.

17 THE COMMISSIONER: All right,
18 Mr. Marshall?

19 MR. MARSHALL: We assumed we
20 were to lead off. I perhaps ought to have checked
21 with my friend, Mr. Gibbs, on that point. I am told
22 by him, though, that he has no witnesses that he
23 wishes to call at this session, at least not at the
24 moment.

25 Sir, our panel today will
26 deal with alternative corridors and routes now, and
27 I'd like to just introduce them briefly and then
28 perhaps Miss Hutchinson could swear those who have not
29 previously been sworn.

30 THE COMMISSIONER: Before you

1 proceed I think I should -- excuse me, Mr. Marshall --
2 I think I should ask your indulgence for a moment.
3 Many of you haven't had the opportunity of becoming
4 acquainted with the people at our Inquiry, and I think
5 I should say for those who are here that the gentlemen
6 at these two tables facing me are the lawyers who repre-
7 sent the various parties.

8 Mr. Scott and Mr. Goudge on
9 my left at the first table, are the lawyers for the
10 Commission itself, or the Inquiry.

11 Mr. Marshall in the middle
12 represents Arctic Gas.

13 Mr. Gibbs and Mr. Hollingworth
14 represent Foothills Pipelines.

15 Mr. Veale, who sits at the
16 second table on my right, represents the Council of
17 Yukon Indians.

18 Mr. Anthony, seated next to
19 him, represents the Canadian Arctic Resources Committee.

20 Mr. Bayly, the gentleman with
21 the very large beard, represents the Inuit people of
22 the Mackenzie Delta.

23 Mr. Bell represents the
24 Indian and Metis organizations of the Northwest
25 Territories.

26 The gentlemen who are at the
27 end of that table, Mr. Jackson, Mr. Weick and Dr. Fyles,
28 are members of the Inquiry staff.

29 I've told you the gentlemen on
30 my left are experts representing Arctic Gas, and the

1 people on my right are members of the Inquiry staff who
2 are taking down everything that is said so there will
3 be a permanent record of it, and the C.B.C. Broadcasting
4 team, Mr. Fraser and the other broadcasters who broad-
5 cast in English and the native languages of the north
6 each evening on the C.B.C.'s Northern Service, and other
7 members of the press as well.

8 Well, having introduced every-
9 one, Mr. Marshall, I turn it over to you again.

10 MR. MARSHALL: Thank you, sir.
11 The members of the panel are Mr. Phil Dau, Mr. Dick
12 O'Rourke -- this is starting from the far end of the
13 table -- Mr. Dau is the gentleman at the end; Mr. Dick
14 O'Rourke next to him; Mr. Les Williams; Mr. Alex Hemstock,
15 Dr. Jack Clark and Dr. Frank Banfield.

16 I believe that all of the
17 witnesses except Mr. Hemstock and Dr. Banfield have
18 testified before the formal inquiries and they have
19 been sworn, sir. Mr. Hemstock gave evidence at Aklavik.
20 I think perhaps Miss Hutchinson may wish to swear the
21 witnesses now and I will then review their qualifica-
22 tions.

23 PHILIP HARVEY DAU,
24 JOHN RICHARD O'ROURKE,
25 GUY LESLIE WILLIAMS,
26 JOHN IVOR CLARK,
27 RUSSELL ALEXANDER HEMSTOCK,
28 ALEXANDER WILLIAM FRANCIS
29 BANFIELD, resumed:

30 MR. MARSHALL: Mr. Commissioner,
when the summary of the evidence was sent out, we
didn't know whether or not Dr. Banfield would be able
to join us. It was either Scotland or the Yukon, and

1 he wisely chose the Yukon. So we were able to add him
2 to the panel. We are not changing the prepared evidence,
3 the direct evidence from that which was circulated.
4 Dr. Banfield will be on the panel and will be able to
5 answer questions in cross-examination.

6 We also are going to have
7 Mr. Wayne Trusty join the panel. Unfortunately, Mr.
8 Trusty hasn't reached the city yet. He is expected to
9 be in about noon, and I'd like to add him to the panel.
10 Hopefully the cross-examination won't have started
11 and he can sit in after the prepared evidence has
12 been given.

13 Mr. Waddell suggested that
14 I review briefly the qualifications of those witnesses
15 who have previously appeared, just so that those from
16 the Yukon who have not been introduced to any of them
17 previously would have some idea of their background.
18 So I will review their qualifications fairly quickly,
19 and then in more detail with those who are giving
20 evidence for the first time.

21 Beginning then with Mr. Dau
22 at the head of the table, Mr. Dau is the president and
23 chief executive officer of Northern Engineering Ser-
24 vices Company Limited. Northern Engineering Services
25 or N.E.S. is the principal consultant to Canadian
26 Arctic Gas. Mr. Dau has a B.Sc. in civil engineering
27 from the University of Alberta, and is a member of the
28 usual professional organizations, including the
29 Association of Professional Engineers, Geologists &
30 Geophysicists of Alberta. His professional experience

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1 as an engineer dates from 1948, and he has been involved
2 in various aspects of the oil and natural gas industry
3 from that date to the present. From 1972 to the
4 present he has been the president and a director of
5 Northern Engineering Services Company Limited. His
6 area of responsibility is that he is as president of
7 the company responsible for all aspects of Northern
8 Engineering Services Company Limited, and specifically
9 responsible for facilities location, connecting pipeline
10 facilities, construction plan, and alternate corridors.
11 DIRECT EXAMINATION BY MR. MARSHALL:

12 Next to Mr. Dau is John Richard
13 O'Rourke. Mr. O'Rourke, since the time we first intro-
14 duced you to the Inquiry you were the co-ordinator of
15 pipeline logistics planning for the Canadian National
16 Railways. I understand your position has changed since
17 then.

18 Q Could you tell the Inquiry
19 what your present position is with C.N.?

20 WITNESS O'ROURKE: I'm now
21 the manager of industrial development for Canadian
22 National Railways, Mountain Region, which covers
23 Alberta and British Columbia.

24 MR. MARSHALL: Sir, Mr. O'Rourke
25 attended the University of Manitoba, graduating with
26 a B.Sc. in 1950. He has worked with C.N. from 1953 to
27 the present, and he was involved in the detailed
28 logistics planning that was done on behalf of Arctic
29 Gas.

30 Next to Mr. O'Rourke is Guy
Leslie Williams, who is well known to the Inquiry, having

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1 appeared on all of the panels to this point, I think.
2 Mr. Williams is the -- is employed by Williams Brothers
3 Canada Limited, seconded to Northern Engineering Services
4 Limited as the director of field services. Mr. Williams
5 has a B.Sc. in civil engineering from the University of
6 Saskatchewan obtained in 1948. He's a member of the
7 usual professional associations, including the Association
8 of Professional Engineers, Geologists and Geophysicists
9 of Alberta, the Association in British Columbia and
10 Saskatchewan as well, and the Engineering Institute of
11 Canada. Mr. Williams' experience as a professional
12 engineer dates to 1948 with the Canadian Pacific Railway.
13 From then until 1957 when he moved to Williams Brothers
14 Canada Limited, he has been with Williams Brothers and
15 then on its formation with Northern Engineering Services
16 from 1972 to the present. He has had responsibility in
17 a number of areas with Northern Engineering Services,
18 including the supervision of construction of the Sans
19 Sault test facility, responsibility for route location,
20 terrain evaluation and construction planning.

21 The next gentleman is Russell
22 Alexander Hemstock. Mr. Hemstock is employed by Imperial
23 Oil Limited. He is on loan to Canadian Arctic Gas as
24 a director of environmental studies. Mr. Hemstock,
25 I'd like to review with you the qualifications as set
26 out in the resume.

27 Q Your B. Sc., sir, was
28 from the University of Alberta?

29 WITNESS HEMSTOCK: Yes sir.

30 Q And in the field of

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1 mining engineering?

2 A That is correct.

3 Q That was in 1943, and that
4 was followed by your Master's in science. What field of
5 endeavor was that in, sir?

6 A The Master's thesis was
7 on the effect of freezing on soils.

8 Q This was a degree obtained
9 from the University of Alberta in 1947?

10 A Yes sir.

11 Q Sir, to deal with your
12 professional affiliations, would you just run through
13 them briefly, sir?

14 A I'm a life member of the
15 Association of Professional Engineers, Geologists &
16 Geophysicists of Alberta.

17 Q You're the past president
18 of that organization as well?

19 A Yes, that's right; and a
20 member of the Canadian Institute of Mining & Metallurgy,
21 and past vice-president of that organization.

22 Q Yes, and I'd like to deal
23 with some of your honors, sir. I understand that you were
24 a distinguished lecturer for the Canadian Institute of
25 Mining in 1972 and 1973.

26 A Yes sir, and distinguished
27 lecturer for the Royal Geographical Society of Canada
28 in 1974.

29 Q And in 1975 you received
30 an award, sir. Could you describe that?

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1 A It's the John Campbell
2 Sproule Memorial Award given by the Canadian Institute
3 of Mining, and the citation deals with contribution
4 to northern engineering.

5 Q Now, sir, to deal with
6 your professional experience, I see from the resume
7 that your connection with the Yukon goes back quite a
8 long ways. Would you just briefly run through your
9 experience beginning with the summer of 1942?

10 A Yes, it was in the summer
11 of 1942 that I first saw Whitehorse, and some of the
12 other parts of the Yukon. I worked that year as a
13 student with the Yukon Consolidated Gold Corporation.
14 In 1943 through 1945 I was assistant field geologist
15 and engineer with the Canol project, and that included
16 in the latter part of that time a study of the operation
17 of the Canol Pipeline over its full length from Norman
18 Wells to Whitehorse. During my Master's thesis I was
19 resident engineer at Norman Wells for the summer part,
20 and also undertook a work under a grant in aid from the
21 Arctic Institute on the effects of permafrost at Norman
22 Wells. Then from 1949 to the present I have had
23 several different positions with Imperial Oil Limited,
24 many of them having to do with the northern problems in
25 exploration and development with that company.

26 Q Perhaps, sir, you could
27 just give a little bit of detail as to some of that
28 experience you've had during your time with Imperial,
29 that particularly pertains to work in the north.

30 A It began with the studies

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the
1 of engineering problems of permafrost at Norman Wells.
2 The difficulties of foundations and of structures on
3 permafrost, including road-building and some pipelines;
4 probably the next most interesting portion of that work
5 dealt with the development of low ground pressure track
6 vehicles for the muskeg over which we were exploring
7 in Northern Alberta and Northwest Territories, Northern
8 B.C. These vehicles really have been developed within
9 the last 20 years to a place where they are quite cap-
10 able of cross-country transportation in soft terrain.

11 There were several years devo-
12 ted to the study of the feasibility of the development
13 of the Tar Sands, again with problems concerning the
14 utilization of equipment in the northern extreme temper-
15 atures and other typical problems in northern develop-
16 ment.

17 Q Thank you, Mr. Hemstock.
18 Your publications are listed in an appendix to your
19 resume, which we will file with Miss Hutchinson, sir.
20 There are some 58 publications listed. Can you des-
21 cribe the area of responsibility that you have with
22 Canadian Arctic Gas, Mr. Hemstock?

23 A I'm the director of
24 environmental studies for Canadian Arctic Gas, and this
25 includes responsibility to advise senior management
26 with regard to environmental matters and to supervise
27 the research studies which have been undertaken with
28 regard to the pipeline.

29 (RESUME OF R.A. HEMSTOCK'S QUALIFICATIONS

30 MARKED EXHIBIT 150)

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MR. MARSHALL: Thank you, sir.

Next to Mr. Hemstock is Dr.

John Ivor Clark, supervisor of geotechnical and environmental studies for Northern Engineering Services Company Limited. Dr. Clark, could you just briefly run through your educational background?

WITNESS CLARK: Yes.

Q You have a B.Sc. in
Mathematics and Physics from Acadia?

WITNESS CLARK: That's right.

Q And your B. Eng., Bachelor of Engineering degree was from where?

A Nova Scotia Technical
College.

Q And a Master of Science
in civil engineering from the University of Alberta in
soil mechanics?

A That's correct, yes.

Q And a Ph. D. in civil
engineering, again the Nova Scotia Technical College?

A That's correct, yes.

Q And your professional
affiliations, sir, you're registered in Alberta and
British Columbia.

A Yes sir.

Q Your professional experience, to review it briefly, sir, begins in 1957 with the Canadian Air Force?

A Yes sir.

Q And could you just

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1 briefly describe some of the projects that you were
2 involved in when working with the Air Force?

3 A My first assignment was
4 in Whitehorse where I was involved with construction
5 that was under way at that time at the Air Force Station
6 on top of the hill here. I was responsible for construc-
7 tion of a number of the buildings there. Some paving
8 on the Alaska Highway within the Whitehorse area. I was
9 then assigned to a project on Hudson Bay in the con-
10 tinuous permafrost region where I was in charge of
11 construction of a wharf, turning base, and a pipeline
12 over muskeg and permafrost to a camp there, a number
13 of buildings and also carried out a number of engineer-
14 ing studies related to the operation of that site.

15 Q Sir, from 1961 to '62 you
16 were with the Department of Public Works.

17 A Yes sir, that was
18 following graduation from the University of Alberta,
19 and I was involved with foundation engineering works
20 relative to the federal building projects.

21 Q And from 1962 to '72 you
22 were chief engineer and head of Geotechnical Division,
23 Materials Testing Laboratories of R.M. Hardy & Associa-
24 tes in Calgary.

25 A That's correct.

26 Q And from 1972 to the
27 present you have been with Northern Engineering Services.

28 A I was seconded to Northern
29 Engineering Services from R.M. Hardy & Associates, yes .

30 MR. MARSHALL: And Dr.

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1 Alexander William Francis Banfield. Dr. Banfield, I'd
2 like to review with you your resume. Would you state
3 your present position, sir?

4 WITNESS BANFIELD: At present
5 I am professor of environmental studies and also director
6 of the Institute of Urban & Environmental Studies at
7 Brock University, St. Catharines, Ontario.

8 Q Sir, in your education you
9 received a B.A. honors in zoology at the University of
10 Toronto in 1942.

11 A Yes sir.

12 Q And an M.A. at the University
13 of Toronto in 1946.

14 A Yes.

15 Q And a Ph.D. in zoology
16 from Michigan in 1952.

17 A Yes.

18 Q Would you list your pro-
19 fessional affiliations, sir?

20 A I'm a Fellow of the
21 Arctic Institute of North America, as well as the
22 American Association for the Advancement of Science.
23 I'm a member of a number of scientific societies, as
24 well as conservation societies and associations.
25 I'm a former director of the American Society of
26 Mammalogists and the Canadian Society of Zoologists,
27 and a member of the Canadian Society of Environmental
28 Biologists. I have also served on two N.R.C. committees
29 that are relevant to this study. I was a member of the
30 Canadian Committee of the International Biological

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1 Program from 1963 to 1973, at its conclusion; and then
2 I served on the Canadian Committee for the Man and
3 Biosphere program from its inception in 1972 to 1975.

4 Q Thank you, doctor. I'd
5 like you to review briefly your professional experience,
6 beginning in 1946.

7 A After war service I
8 joined the Civil Service first in the National Parks
9 Service. I thought I was on my way to Banff National
10 Park as a park naturalist, but instead on my first
11 appointment in Ottawa I was given a one-way ticket to
12 Aklavik, Northwest Territories, where I was instructed
13 to investigate the muskrat trapping industry. That was
14 in 1946, May 1946, and as a result of my report I
15 introduced the registered traplines and native group
16 traplines to the Mackenzie Delta.

17 In 1947 the Canadian Wildlife
18 Service was formed and I joined it as chief mammalogist.

19 Q Would you go over some of
20 the work that you were involved in in that position,
21 sir?

22 A Yes, I conducted the
23 preliminary barren ground caribou investigation on the
24 Central Barrens from 1948 to 1950. I then was posted
25 to the National Parks again as chief park naturalist.
26 In 1951 I conducted an investigation of the Kluane
27 Game Sanctuary in the Yukon Territory here. In 1953
28 I conducted a game survey of the Arctic Islands,
29 caribou and muskoxen. In 1954 to '56 the Ungava caribou
30 survey; and in 1956-1957 I supervised a re-survey of

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1 the caribou, although by this time I was riding a desk
2 in Ottawa.

3 Q You then moved over to
4 the National Museum of Canada, sir, did you?

5 A Yes, in 1957 I was
6 appointed chief zoologist of the National Museum, and
7 at that time I commenced studies of the relationship of
8 caribou to reindeer, and in 1959 conducted a study of
9 reindeer industry and wild reindeer in Northern Europe
10 and Asia. In 1964 I was appointed director of the
11 National Museum of Natural Sciences, and primarily
12 that was a time of administrative chores, although I
13 did conduct mammal surveys on the northern Boreal Island
14 of Japan, the Island of Hokkaido. At that time I also
15 commenced writing "The Mammals of Canada."

16 Q Which has recently been
17 published by the University of Toronto Press?

18 A Yes. In 1974 published
19 by University of Toronto Press.

20 Q You began teaching at
21 Brock University in St. Catharines in 1969.

22 A That is correct.

23 Q And in 1973 you assumed
24 the directorship of the Institute of Urban & Environ-
25 mental Studies.

26 A Yes. The first five years
27 I taught ecology as a professor of biological sciences,
28 and then more recently as environmental studies.

29 Q I understand you're about
30 to head off on a sabbatical.

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1 A Yes, I'm happily on sabba-
2 tical leave this year and about to leave for the Univer-
3 sity of Edinburgh where I will be joining a group
4 studying the environmental impact of oil discoveries in
5 the North Sea.

6 Q And sir, you have to your
7 credit these various publications that we have listed
8 in the appendix to your C.V.?

9 A Yes sir.

10 Q What services have you
11 provided to Arctic Gas and Northern Engineering Services
12 as an environmental consultant?

13 A I'm an environmental
14 consultant to Northern Engineering Services. My general
15 function is as a scientific advisor in the environmental
16 field. Originally my chief responsibility was with
17 reference to the total mammal research program conducted
18 by the other consultants with Northern Engineering
19 Services. Since '73 I have become more involved in a
20 general overview, environmental overview of the proposal
21 with particular special reference to the biotic compon-
22 ents of the environment. That would be the vegetation,
23 fisheries and wildlife.

24 MR. MARSHALL: Thank you very
25 much, Dr. Banfield. As I mentioned, sir, Mr. Trusty,
26 I hope, will be joining us this afternoon.

27 I have for Miss Hutchinson a
28 copy of the list of reports that the panel relies upon
29 in support of their evidence, and too, sir, we circulated
30 with that prepared evidence a one-page map just for

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1 convenience of the readers in following through the
2 various corridors. If you wish we can have that marked.
3 I have an extra copy for Miss Hutchinson.

4 (RESUME OF DR. BANFIELD'S QUALIFICATIONS MARKED
5 EXHIBIT 151)

6 (LIST OF REPORTS RELIED ON MARKED EXHIBIT 152)

7 MR. MARSHALL: Mr. Commissioner,
8 I'd like Mr. Alex Hemstock to present the direct evidence
9 of the panel. Mr. Gibbs has just raised the question
10 of Mr. Hemstock being sworn. I understand that he was
11 sworn at the community hearing.

12 THE COMMISSIONER: Well, you
13 said so and I was certainly prepared to accept that.
14 Well, what do you say, Mr. Hemstock?

15 WITNESS HEMSTOCK: Yes, I was
16 sworn at Aklavik.

17 THE COMMISSIONER: Well, I
18 think that covers it.

19 MR. MARSHALL: Could you begin
20 then, Mr. Hemstock?

21 A Studies were conducted
22 by Arctic Gas of alternative corridors and routes for
23 the proposed pipeline. Section 14(e)(1), alternative
24 corridors, Exhibits 59, 60, 63 and 64, discusses in
25 detail the major routes and corridors investigated.

26 It should be made clear that
27 the use of the word "corridor" within Section 14(e)(1)
28 and within this prepared direct testimony refers to a
29 general pathway through a relatively independent area,
30 quite distinct from other corridors. "Corridor" as

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1 used herein is not to be construed as the transportation
2 corridor contemplated in the pipeline guidelines which
3 would be universally acceptable over its entirety for the
4 routing of all short and long-run transportation systems.
5 The term "route" is used throughout Section 14(e) (1)
6 and herein to indicate a specific alignment for the
7 pipeline, within a corridor.

8 Examination of terrain and
9 environmental factors indicated five basic pipeline
10 corridors in Alaska and Northwestern Canada, and Arctic Gas
11 examined each of them. Study of Northwestern Canada,
12 however, has shown that the Mackenzie Valley is the
13 clearly superior pathway for a natural gas pipeline.
14 Accordingly, three of the five corridors, including that
15 of the prime route, follow through that pathway through
16 the Northwest Territories of Canada, and thus differ
17 from each other only in regard to the portion of the
18 line which runs from Prudhoe Bay, Alaska, east through
19 the Yukon Territory of Canada to its junction with the
20 line from the Mackenzie River Delta production area.

21 The corridors are shown on the
22 large map on the wall, behind me here. You may also
23 wish to refer to the first map, which is Drawing 4-0204-
24 1014 in Exhibit 60, the alternative corridor drawings.

25 On the large wall map, both
26 the prime and the interior routes have been shown in
27 red. Near the top of the wall map the red route closest
28 to the coast is the prime route, which moves easterly
29 from Prudhoe Bay along the Coastal Plain of Alaska
30 generally within five to 15 miles of the Beaufort Sea,

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1 crosses the Alaska-Yukon border south of Demarcation
2 Point, follows the Yukon coast past Shingle Point, con-
3 tinues in a south-easterly direction along the western
4 edge of the Mackenzie Delta, then turns east to the
5 junction near Travaillant Lake with the line from the
6 delta production areas. The combined line then moves
7 south-east through the Mackenzie River Valley into
8 Alberta.

9 One alternative corridor is
10 designated the offshore corridor, differs mainly in
11 Alaska in that it moves offshore into the waters of the
12 Beaufort Sea about 60 miles east of Prudhoe Bay and
13 returns to land in the Yukon. That corridor is shown in
14 black on the large wall map, immediately above the prime
15 route. The only reason to consider an offshore route
16 would be because of the unavailability of an adequate
17 onshore route, or to shorten the line. Under present
18 circumstances, the major reason to consider the offshore
19 corridor is the possibility that the prime route
20 may not be available because of the existence of the
21 Arctic National Wildlife Range. The northern boundary
22 of the Arctic National Wildlife Range runs westerly for
23 some 135 miles along the Beaufort Sea from the Alaska-
24 Yukon border, and the routing of the offshore corridor
25 was chosen to avoid that area to the greatest possible
26 extent.

27 A second alternative has been
28 designated as the interior route, and is also shown in
29 red on the map. It is shown in red because it has been
30 studied in detail commensurate with that for the prime

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1 route, and would be proposed in the event that the
2 prime route was not available because of the existence
3 of the Arctic National Wildlife Range. The interior
4 route moves south-east from Prudhoe Bay through the
5 Brooks Mountain Range, then turns east into Canada and
6 crosses the Northern Yukon north of Old Crow and the
7 Porcupine River before joining the Mackenzie Valley
8 line portion of the prime route at the same junction
9 near Travaillant Lake as does the prime route from Alaska.

10 Two specific alignments for the
11 pipeline along the interior corridor have been studied.
12 Those alignments differ, however, only over a distance
13 of 30 to 35 miles within the Brooks Mountain Range.
14 General reference to the interior route refers to the
15 alignment which is identified as the Marsh Fork option.
16 Routing of the Marsh Fork option follows the Marsh Fork
17 of the Canning River over the 35 miles referred to above.
18 Accordingly, the Marsh Fork option is located outside
19 the boundary of the Arctic National Wildlife Range,
20 outside the smaller of the proposed extensions of the
21 Wildlife Range, and within the utilities corridor desi-
22 gnated by the United States Department of Interior.
23 The second option, the Canning River option, includes a
24 shorter and more easterly route over the 30-mile stretch
25 through the Brooks Range along the main branch of the
26 Canning River itself. This option, while being about
27 five miles shorter than the Marsh Fork option -- and
28 it's 30.6 miles versus 35.5 miles -- lies adjacent to the
29 west bank of the Canning River which is the boundary of
30 the Arctic National Wildlife Range, and is located

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1 partially within the smaller of the proposed extensions
2 of the Wildlife Range. The Canning River option appears
3 to be environmentally more acceptable than the Marsh
4 Fork option, and involves less difficult construction
5 and less cost.

6 The other two northern alter-
7 native corridors, the Fairbanks and the Fort Yukon
8 corridors, differ from the prime route because they do
9 not include the Mackenzie Valley portion of the prime
10 route.

11 Shown in orange on the large
12 wall map is the Fairbanks corridor. It runs south from
13 Prudhoe Bay generally parallel to the Alyeska Oil Pipe-
14 line route shown in green, to a location south of Fair-
15 banks known as Big Delta, then it curves eastward
16 through Alaska along the route of the Alaska Highway
17 past Whitehorse and Watson Lake in the Yukon, past
18 Fort Nelson, and Fort St. John in British Columbia,
19 and then on to join the prime route at a location just
20 north of Edson, Alberta. The Fairbanks corridor requires
21 a new corridor in Canada for the line from the Mackenzie
22 Delta area, from Richards Island to just north of Inuvik,
23 south-westerly to near Fort McPherson, then roughly
24 parallel to the Dempster Highway location to a point
25 south-west of Dawson and on to join the Alaska leg at
26 Whitehorse.

27 Finally, the Fort Yukon
28 corridor, shown in light blue on the wall map, parallels
29 Alyeska's Oil Pipeline route to a point north of
30 Galbraith Lake before veering to the south-east to pass

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1 near Fort Yukon. It then generally follows the Yukon
2 River to Dawson, continues south-east to Pelly Crossing
3 and then follows the Pelly and the Liard Rivers through
4 to Watson Lake to join the Fairbanks corridor at that
5 point. As with the Fairbanks corridor, the same corridor
6 along the Dempster Highway to Dawson is required for
7 the line from the Mackenzie Delta.

8 For each alternative route or
9 corridor, the general pattern followed within Section
10 14(e)(1) was to discuss first those factors which were
11 common to Canadian and Alaskan segments. Thereafter,
12 separate discussion was devoted to the Alaskan and
13 then the Canadian segments of the corridor. After the
14 discussion of each corridor, sub-section 1.7 examined
15 and compared the prime and alternative corridors from
16 a socio-economic point of view, sub-section 1.8 discuss-
17 ed the concept of common corridors, and sub-section 1.9
18 set forth Arctic Gas' conclusions relevant to alternative
19 corridors.

20 It was upon the basis of its
21 conclusions following the above studies that Arctic
22 Gas determined that the prime route offers the most
23 net advantages and is the most feasible corridor for the
24 needed pipeline system.

25 It is the purpose of this
26 prepared direct testimony to highlight from Section 14
27 (e)(1) those major reasons why the studies of the alter-
28 native routes and corridors led to the selection of the
29 prime route over the interior route and the rejection of
30 the others.

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1 Then relative to areas of pot-
2 ential gas reserves, any considerations of alternative
3 gas pipeline corridors must include an evaluation of the
4 location of such corridors relative to the location of
5 likely future areas of production of natural gas. This
6 is obviously significant from the viewpoint of likely
7 economy of cost over-all, if routes to connect existing
8 supply areas can run near future supply areas.

9 Arctic Gas has taken the
10 position that it is environmentally, as well as econom-
11 ically advantageous to minimize the miles of pipe and
12 numbers of appurtenant facilities. To the extent that
13 single lines can connect multiple(present and future)
14 supply areas, this goal is more fully achieved with the
15 prime route.

16 In Alaska, the Arctic slope
17 province is clearly the area of top gas prospects by
18 any measure. It includes an area of more than 100,000
19 square miles, of which 70,000 square miles is consid-
20 ered potentially petroliferous. Included in that
21 area are the northern foothills of the Brooks Range,
22 south-east of Prudhoe Bay, and the 20,000 square miles
23 of sedimentary rock under the Beaufort Sea adjacent
24 to the coast, which are considered prime prospects.

25 The Mackenzie Delta-Beaufort
26 basin, ranked No. 1 in the Yukon and Northwest Terri-
27 tories, has characteristics similar to other typical
28 tertiary deltas and regions offshore in various parts
29 of the world which contain disproportionately large
30 volumes of gas.

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1 The Eagle Plain basin, ranked
2 No. 2 in petroleum prospects in the Yukon and Northwest
3 Territories, contains approximately 3,000 square miles
4 and is located between the Kandik basin and the
5 Richardson Mountains. Oil and gas have been encountered
6 in the Eagle Plain basin and further exploration is
7 expected.

8 THE COMMISSIONER: I wonder,
9 before you go on, could you point out that last, the
10 Eagle Plain basin?

11 A As I recall, that is
12 in a map in the Section 14(e) which perhaps we could
13 have.

14 THE COMMISSIONER: Mr. Williams
15 could just joint it out to us, so that would be in that
16 part of the Yukon south of Old Crow, would it be? Am
17 I looking at the right -- is that a sort of general
18 description?

19 WITNESS WILLIAMS: More
20 easterly, I would say, Mr. Commissioner, rather than
21 south. If you look at the map the Arctic platform comes
22 down close to Old Crow in this manner. This is the
23 Eagle Plain generally in this area. Here is Old Crow.

24 THE COMMISSIONER: So it
25 is generally south-east of Old Crow?

26 WITNESS WILLIAMS: Yes.

27 THE COMMISSIONER: So that with-
28 in Canada you mentioned the Mackenzie Delta-Beaufort
29 basin, which we're all familiar with, and then the
30 Eagle Plain basin. Well, thank you. Carry on from

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1 there. I just wanted to--

2 WITNESS HEMSTOCK: Oil and
3 gas have been encountered in the Eagle Plain basin and
4 further exploration is expected.

5 Both the prime route and the
6 offshore corridor are located within the Arctic slope
7 province in Alaska over their entire length. Gas has
8 been found at various locations in those areas, includ-
9 ing areas to the south-east and south-west of Prudhoe
10 Bay.

11 The interior and prime routes
12 and the offshore corridor have a common route east and
13 south of their junction, and that route passes through
14 or by not only the Mackenzie Delta-Beaufort basin, but
15 also the provinces of potential gas supply which are
16 in a third level ranking in Northwest Canada.

17 The clear difference --

18 THE COMMISSIONER: Excuse me,
19 Mr. Hemstock. Do you use the word "province" in a
20 special sense?

21 A Yes, that is correct.
22 It's a -- it deals with a basin or a separate area,
23 and it is called an oil province.

24 Q All right. That's
25 useful to know. Carry on, sir.

26 A The clear difference
27 between the alternative routes and corridors and between
28 them and the prime route is their proximity to likely
29 future additional gas development. Each route taps
30 the Mackenzie Delta area. But the prime route traverses

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1 the North Slope, which with its adjacent offshore areas,
2 is rated high in potential production capabilities. The
3 prime and interior routes traverse the Mackenzie Valley
4 which includes an area of reasonable promise of produc-
5 tion. The Fairbanks and Fort Yukon corridors simply
6 traverse the Prudhoe Bay and Mackenzie Delta areas
7 north to south, but otherwise move away from the coast
8 and coastal plain to and through areas which are rated
9 as having less likely oil and gas productivity. This
10 factor is significant to gas consumers, in the interest
11 of prompt access to additional gas supply and avoidance
12 of the cost of extending additional pipelines in differ-
13 ent areas may also be desired by persons whose major
14 concern is environmental change.

15 MR. MARSHALL: Go on then
16 to "System Configuration and Design," Mr. Hemstock.

17 A Basic engineering design
18 of the pipeline systems for each of the alternative
19 routes and corridors would be the same as the design
20 for the prime route. In both Canada and the United
21 States, 48-inch diameter pipe would be used.

22 Compressor station locations
23 are selected on the basis of design for a maximum
24 throughput of 4,500 million cubic feet of gas per day,
25 the level for this size pipe when it has optimum horse-
26 power. This is the level of throughput for the main-
27 line portion of each system, south of the junction of
28 the supply lines from Prudhoe Bay and the Mackenzie
29 Delta producing areas. The ultimate number of compres-
30 sor stations at that 4,500 million cubic feet per day

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1 mainline throughput level is 41 for each of the systems.
2 The basic format of the Arctic Gas application is that
3 the 4,500 million cubic feet per day level of mainline
4 throughput is reached in the fifth year of operation,
5 and that in the years up to and including the fifth
6 year, the throughput from each supply line will not ex-
7 ceed 2,250 million cubic feet per day. Accordingly,
8 neither supply line would be fully powered during such
9 periods. The supply lines in each system have been
10 sized to avoid the need for looping until either of
11 them is carrying over 4,500 million cubic feet per day.

12 The basic difference in the con-
13 figuration of the pipeline systems at the maximum main-
14 line system throughput and with 2,250 million cubic
15 feet per day from each supply line is in the number of
16 stations operating on the mainline, and on each of the
17 supply lines, and in the total pipeline mileages instal-
18 led. Now we have a slide which illustrates this table
19 which we have here, and perhaps Mr. Williams could
20 point out the figures. This slide summarizes the
21 number of stations and mileages involved in each
22 alternative and indicates the facilities which would
23 be located in the Yukon.

24 The slide is titled:

25 "Comparison of numbers of compressor stations
26 at 4,500 million cubic feet per day mainline
27 throughput and pipeline mileages."

28 Q Excuse me, Mr. Hemstock.

29 This slide is the same table as is found at page 9
30 of the prepared evidence?

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1 A Yes, that's the table which
2 appears at page 9 of the direct evidence. Perhaps in
3 the interest of time, if I just illustrated the prime
4 route which is on the left side, and the Fort Yukon
5 corridor, which is at the far right. Will you just
6 look down to see the comparisons?

7 With regard to stations, the
8 Prudhoe supply line, the prime route has two stations;
9 the Fort Yukon corridor has three; the Mackenzie supply
10 line, of course, there are none on the prime route and
11 there are two on the Fort Yukon corridor. On the
12 mainline to Caroline there are 31 on the prime route,
13 and there are 27 for the Fort Yukon corridor. Stations
14 in the Yukon are one on the prime route, there are 11
15 with the Fort Yukon corridor.

16 Then to take a look at pipeline
17 mileages, which is the lower portion of the table,
18 again for the prime route the Prudhoe supply line is
19 492 miles, and the Fort Yukon corridor is 584 miles.
20 The Mackenzie supply line, the prime route, 142 miles,
21 the Fort Yukon corridor 469. The mainline, the prime
22 route to Caroline, 1303; and the Fort Yukon corridor,
23 1302. The mileage in Yukon, 134 on the prime route
24 and 826 the Fort Yukon corridor, for a total system
25 mileage for the prime route of 2,629, and the Fort
26 Yukon corridor, 3,044.

27 If we look just along the
28 bottom line, the total system mileage for the interior
29 route is 2,674, for the offshore corridor, 2,638,
30 and the Fairbanks corridor, 3,549.

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MR. MARSHALL:
Mr. Commissioner, there

seem to be some discrepancies between the figures that
are set out in the slide and those that are shown on
page 9, particularly in pipeline mileages with respect
to the mainline to Caroline and mileage in the Yukon.
At the break we'll double check this and I'll ask Mr.
Hemstock to go over it again.

THE COMMISSIONER: I think
we'll take the break now. We'll stop for a few minutes
for coffee then, and you can check that out.

(PROCEEDINGS ADJOURNED FOR FEW MINUTES)

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: Ladies and
gentlemen, let's take our seats again and we can get
under way.

MR. MARSHALL: A number of
people have asked for copies of the direct evidence.
Unfortunately, the extra copies that we had intended
to have here are still in Yellowknife. We'll have more
run off over the noon hour and have them available in
the afternoon.

THE COMMISSIONER: Fine.

MR. MARSHALL: We were going
through the chart that's projected and I understand
that they've gone through it and compared it with the
chart that's on page 9 of the prepared direct evidence,
and the chart in the material that was circulated is
the correct one, and there were errors in the one that
was projected, and they have now been corrected.

Mr. Hemstock, though, can

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comment about the last line which is total system
mileage, and whether or not those columns total.

Q Mr. Hemstock, could you
just explain that, please?

A Yes sir, I think that
there has been some confusion with the lower figure,
which is the total system mileage. The second portion
of the table headed:

"Pipeline Mileages"
refers simply to those mileages of pipeline listed.
For instance, the Prudhoe supply line, 492, is simply
the length or the number of miles of pipeline in that
particular portion of the line. The lower line, which
is the mileage in the Yukon, refers to the number of
miles of pipeline, perhaps, of some of the top ones which
lie within the Yukon Territory; and finally the
lower line which is the total system mileage, is just
that. It means the total system to the border points
of Monchy and King's Gate, and there may have been
confusion in that the table lists the mainline to
Caroline as one of the headings under "Pipeline Mile-
ages".

MR. GIBBS: Does
that total system mileage then include the mileage
within Alaska?

A No, this is within
Canada, the total system mileage.

MR. GIBBS: Every-
thing?

A That's correct, yes.

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1 2,629 is the total system mileage including Alaska.

2 THE COMMISSIONER: I think it
3 must be.

4 A That's right.

5 MR. Gibbs: Prudhoe Bay to the
6 49th Parallel?

7 A Yes.

8 MR. MARSHALL: Q Will you go
9 on then, Mr. Hemstock, and deal with "Geotechnical
10 Considerations"?

11 A The geotechnical consider-
12 ations related to the design and construction of the
13 pipeline system within each of the alternatives are
14 generally the same, but of varying degree, dependent on
15 location. They include erosion and slope stability in
16 mountains and foothills, construction in high ice content
17 soils, excavations in bedrock, and construction near
18 water courses subject to laterally shifting channels.

19 Slide 2 summarizes some of the terrain conditions
20 along the alternative routes and corridors north of
21 Caroline.

22 Again, Mr. Williams has a
23 slide which is the same as you will find on page 10 of
24 the direct evidence, entitled:

25 "Comparison of terrain conditions along the
26 alternative routes and corridors north of
27 Caroline."

28 Again, perhaps for purposes of
29 illustration I'll list the factors under the prime route
30 and the Fort Yukon corridor, the columns to the left and

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1 right respectively on the chart. For the prime route,
2 there are 700 miles within the continuous permafrost
3 zone, versus 430 for the Fort Yukon corridor. For the
4 prime route there are 775 miles within the discontinuous
5 permafrost zone, and there are 1,300 for the Fort Yukon
6 corridor. On the prime route there are no miles of
7 mountainous terrain, and there are 725 miles for the Fort
8 Yukon corridor.

9 Q Mr. Hemstock, would you
10 deal now with "Construction and Logistics Considerations"?

11 A It has been assumed that
12 the construction of facilities along any of the alterna-
13 tive routes or corridors would be accomplished within the
14 same overall time frame as for the prime route. The plans
15 for construction developed for the prime route are in large
16 part applicable to the alternatives. In particular,
17 where facilities are identical, from the Mackenzie Delta
18 producing areas through Travaillant Lake junction to
19 Canadian and United States markets, in the case of the
20 interior route or offshore corridor and from north of
21 Edson, Alberta to Canadian and United States markets in
22 the case of the Fairbanks or Fort Yukon corridors, the
23 construction plans presented in sub-section 13.a.1 of
24 the application are applicable.

25 Construction plans for the
26 interior route, located between Prudhoe Bay and the
27 Travaillant Lake junction differ from those plans for the
28 prime route mainly in that construction in Alaska would
29 be completed, utilizing two additional spreads, each
30 working over two summers and two winters. In contrast,

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1 construction along the Alaskan segment of the prime
2 route would utilize three spreads working one winter
3 season only. The different construction plans covering
4 the Alaskan segment of the interior route results from
5 the fact that a considerable amount of bedrock is encount-
6 tered along some 90 miles of the route. Logistics fun-
7 ctions associated with construction through the interior
8 route depend extensively on land transport, rather
9 than on barge transport as is the case through the
10 prime route. With both routes approximately 35 miles of
11 pipe would be barged to the area of Fort McPherson.

12 Construction plans developed
13 for the cost comparisons for the offshore corridor
14 facilities differed from those that were developed for
15 the prime route only insofar as the offshore construc-
16 tion and certain onshore work associated with the off-
17 shore portion of the corridor was concerned. The
18 offshore section would have to be installed in the
19 summers of the first and second construction years. The
20 comparable segment of the prime route would not be in-
21 stalled until the winter of the third construction year.
22 The onshore work would be required in association with
23 the portions of offshore lines laid in shallow waters.
24 These locations would be at the extremities of the off-
25 shore section and at points of connection to onshore
26 future compressor station sites. Sections could be
27 welded together on shore and pulled seaward, or welded
28 on barges and pulled landward after the necessary
29 excavation was completed.

30 Technically, the construction

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1 of an offshore pipeline is feasible. Arctic Gas cannot,
2 however, consider utilizing the route chosen within the
3 offshore corridor because of the operation and main-
4 tenance problems, which are the possibility of ice
5 scour and the inability to repair the line during the
6 breakup and freezeup periods, which are six to seven
7 months or so in length.

8 It must be reiterated that the
9 construction of an Arctic offshore pipeline within the
10 time frame allowed for construction along the prime
11 route could only be considered technically feasible
12 if the assumptions that were made in reaching that
13 conclusion were confirmed by further research.

14 Those assumptions included:

- 15 1. The gathering of further ice cover data would con-
16 firm the number of weeks with ice cover of 3/8ths or
17 less. The indication is that there are only approxi-
18 mately seven weeks each summer when the shallow water
19 depths along the coast have less than 3/8ths of the
20 surface covered with ice.
- 21 2. Construction operation in ice cover of 1/8th to
22 3/8ths would prove to be feasible following more
23 detailed analysis. There are approximately three weeks
24 each summer when the shallow water depths are either
25 clear of ice or have less than 1/8th of the surface
26 covered with ice.
- 27 3. Burial depth would be confirmed by a survey of
28 scour depths along the actual pipeline route.
- 29 4. The necessary soil sampling required to determine
30 soil characteristics and excavation requirements would

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1 be completed within the required timetable.

2 5. Excavation equipment based on soil sampling studies
3 would be developed, tested and made available within
4 the required timetable.

5 Assuming that facilities
6 through the Fairbanks corridor could be constructed
7 within an equivalent time span requires much more
8 optimistic assumptions as to spread construction ability
9 per day, and assumes the ability to construct various
10 questionable areas in the summer. The Fairbanks corri-
11 dor has over 900 more miles of pipeline, but does have a
12 considerable portion of it in mountainous terrain, which
13 allows a greater proportion of summer construction.
14 But the very large extra distance, never theless, and
15 difficult mountain construction makes the degree of con-
16 fidence that it could be constructed over the indicated
17 period much less than with the prime route.

18 As with the Fairbanks corridor,
19 the study of the Fort Yukon corridor was prepared on the
20 basis that the pipeline system would be completed on
21 roughly the same time schedule as the prime route pipe-
22 line. The fact that there is also considerable mountain
23 terrain along the Fort Yukon corridor which lends itself
24 to summer construction would be of assistance in meeting
25 such schedules, but the schedule still requires use of
26 production schedules which may not be achievable. The
27 corridor involves about 400 miles more than the prime
28 route.

29 And we have another slide
30 which presents a comparison of the seasonal mileages

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1 and construction spread requirements for each of the
2 alternatives. Again perhaps in the interests of time
3 if we look at the prime route, which is the first
4 column, and the Fort Yukon corridor, which is the
5 last column, in the first winter the mileage on the
6 prime route would be 700 miles, and there would be
7 nine spreads required. The Fort Yukon corridor would
8 be 595 with nine spreads required. The first summer
9 on the prime route the mileage would be 737, with five
10 spreads required; and for the Fort Yukon corridor,
11 924 with nine spreads. The second winter the mileage
12 on the prime route would be 700, with nine spreads;
13 but for the Fort Yukon corridor, 584 miles with nine
14 spreads. The second summer there would be no equip-
15 ment required on the prime route, but the Fort Yukon
16 corridor would have 941 miles, which would require
17 nine spreads. The third winter there would be 492
18 miles on the prime route with eight spreads; and there
19 would be none required on the Fort Yukon corridor.

20 Again, the total mileage for
21 the prime route, 2,629; the Fort Yukon corridor, 3,044,
22 and the maximum spread requirement for these two
23 corridors are nine in both cases.

24 Logistics efforts associated
25 with constructing facilities along the alternatives
26 are generally more involved and consequently more
27 costly than the logistics efforts for the prime route.
28 For instance, between Prudhoe Bay and Travaillant Lake
29 in excess of 300 miles of pipe would be scheduled to
30 be moved overland from ports in Southern Alaska -- they

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1 are Anchorage, Valdez and Skagway -- to the interior
2 route, whereas all the pipe for the comparable portion
3 of the prime route is scheduled to be barged to stock-
4 pile sites near the prime route. Earlier requirements
5 for construction equipment and materials and longer con-
6 struction programs for the interior route, Fairbanks
7 and Fort Yukon corridors also contribute to earlier and
8 more time-consuming logistic support.

9 Q Would you go on, sir,
10 with the "Operation and Maintenance Considerations"?

11 A The operation and mainten-
12 ance of pipeline facilities constructed within any of
13 the various alternatives would require a significantly
14 greater performance effort than the effort required for
15 the prime route. This increased effort is attributable
16 to an increase in length of the pipeline, and to the
17 topography and consequent difficulties of access and
18 travel in the mountainous terrain traversed by the
19 interior route, Fairbanks and Fort Yukon corridors.

20 A substantial part of the work
21 of maintaining a pipeline and its right-of-way is
22 involved in the surveillance of, and remedial repairs to
23 critical areas in which susceptibility to soil erosion
24 exists on the right-of-way. This susceptibility occurs
25 almost exclusively in seasons when the active layer is
26 unfrozen and might be expected at locations where the
27 pipeline traverses steep grades, or the banks of rivers
28 and streams. Such locations would be minimized in the
29 process of selecting the detailed pipeline routing and
30 would be provided during construction with control

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1 measures to serve the previously existing drainage
2 patterns across and along the right-of-way, and to main-
3 tain the natural stability of slopes. As points of
4 potential remedial repair activity, such control measur-
5 es require continual observation. They would be
6 much more extensive along the interior route, Fairbanks
7 and Fort Yukon corridors than along the prime route.

8 In comparing the relative diffi-
9 culty of operating and maintaining a pipeline system
10 along any of the alternatives, appreciable differences
11 emerge from a consideration of access to the system.
12 The scheme of operation is based primarily on the use of
13 aircraft to transport personnel from their operating base
14 to or near their scheduled point of maintenance activity.
15 Along the prime route, the generally low relief enables
16 the construction of airstrips relatively close to each
17 of the compressor station sites (and related pipeline
18 maintenance equipment storage facilities), and there-
19 fore efficient transport of personnel via fixed wing
20 aircraft. Along the interior route, Fairbanks and Fort
21 Yukon corridors, the mountainous terrain precludes
22 the construction of airstrips at some of the existing
23 and future compressor station sites. The transportation
24 of personnel to these sites would involve overland
25 travel along the right-of-way for several miles from
26 the nearest airstrip, or alternatively, the use of
27 helicopters.

28 Operation and maintenance
29 activities associated with a pipeline system in the
30 offshore corridor would differ from those activities

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1 for the prime route only insofar as the offshore section
2 of the pipeline is concerned. The most critical problem
3 confronted by an Arctic offshore pipeline operator is
4 in the area of maintenance of the line, and especially
5 in the repair of any malfunction or damage. Arctic Gas
6 cannot conclude that a pipeline, once installed in such
7 a harsh environment, could be repaired promptly if a
8 pipeline interruption occurred during freezeup or ice-
9 breakup periods. While the service continuity risk
10 may well be taken if only a gathering line to connect
11 a limited gas source to the mainline were involved,
12 so that an extended outage would affect only that single
13 gas source, Arctic Gas cannot justify such a risk
14 for a main supply line which would be depended upon by
15 millions of gas consumers.

16 Initially and in the long term,
17 therefore, it has been determined that the operation and
18 maintenance of a pipeline along any of the alternatives
19 would require greater effort and higher cost than for
20 a pipeline along the prime route.

21 Q Could you deal now with
22 the "Cost Considerations" that would apply to each of
23 these alternatives, sir?

24 A In order to allow compari-
25 son of projected costs of the proposed pipeline along
26 the prime route with the costs associated with the
27 alternative routes, preliminary cost estimates were
28 developed with regard to each, and on the basis of
29 common costing and financial criteria and assumptions.
30 All estimates were based on 1973 dollars. Those

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principles and the estimated costs were set forth in Section 14(e) of the application, Exhibit 59. The principles were discussed in the general introduction to 14(e) while the estimated costs were presented throughout the body of Section 14(e) (1)

It is believed that the degree of uniformity of application of the principles makes the comparisons which were set forth in Section 14(e) valid and thus relevant in the choice between the alternative routes. Arctic Gas did, of course, up-date the cost estimates to a 1974 basis for the prime route. Cost of facilities, pro forma financial statements, tariffs and the financing plan for the prime route were filed as Sections 10, 11, 12 and 15 with the National Energy Board in November of 1974. During the 1974 up-date of costs, some of the parameters were modified, particularly in the area of tariff calculations. Arctic Gas, however, considers that the cost estimates set forth in 14(e) are still valid for the purpose of comparison.

The estimates of capital and operating costs and resultant unit costs of transportation of the pipeline system along the various alternatives prepared upon the above basis was summarized in Section 14(e) as to:

1. The total capital cost, Canada and Alaska, when sufficient facilities have been constructed to allow the system to transport 4.5 billion cubic feet per day.
2. The annual operating cost, total system, for the first year of 4.5 B.C.F. per day throughput, exclusive

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of cost of natural gas consumed as fuel.

3. The tariff, computed on a present value basis at 10% discount rate, per Mcf. of natural gas delivered to recipients of the gas from Canadian Arctic Gas Pipeline Limited.

Slide 4 summarizes the comparative capital cost estimates as shown in Section 14(e), and this slide is titled:

"Capital cost differences between the prime route and alternative corridors as filed in application, March, 1974."

There are three columns, the first is the route or the corridor; the second, the capital cost estimate in thousands; and finally the capital cost difference in thousands. The prime route, the capital cost is \$5,742,700⁰⁰⁰; the interior route, the capital cost estimate is 6,268,200⁰⁰⁰; and therefore the capital cost difference is 525,500⁰⁰⁰. The offshore corridor, the capital cost estimate is 6,033,600⁰⁰⁰, with a difference then of 290,900⁰⁰⁰; the Fairbanks corridor, the capital cost estimate is 8,128,600⁰⁰⁰, with a capital cost difference of 2,385,900⁰⁰⁰; and the Fort Yukon corridor, the capital cost estimate is 6,659,800⁰⁰⁰, with a capital cost difference of 917,100⁰⁰⁰.

THE COMMISSIONER: Mr. Hemstock, those estimates were as filed in March, 1974. When you said the cost of the prime route -- well, are those the most recent figures for the prime route? I take it they are for all of the other routes.

A I'm looking for some

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1 help here. Mr. Trusty, who will be very helpful in this
2 area, can clarify that when he arrives, but I believe
3 that they are up-dated and are the latest.

4 WITNESS DAU: Mr. Commissioner,
5 all the costs here are based on the 1973 estimate.
6 There has since been another estimate on the prime
7 route based on 1974 costs.

8 THE COMMISSIONER: Well, all
9 of these figures then are the 1973 estimates. What is
10 the figure now then for the prime route based on the
11 1974 estimate? Does anyone have it?

12 WITNESS DAU: I can get it for
13 you, sir. I don't have it at my fingertips.

14 MR. MARSHALL: Mr. Gibbs probably
15 has.

16 THE COMMISSIONER: Give or take
17 a few billion?

18 MR. MARSHALL: I thought Mr.
19 Gibbs might leap to the mike and throw out a few
20 figures, sir, but he seems to not have that in his
21 armory this morning.

22 (LAUGHTER)

23 WITNESS HEMSTOCK: These are
24 then the 1973 costs, as filed and the prime route costs have been
25 up-dated and we'll get that figure for you.

26 MR. GIBBS: Well, sir, in
27 Sections 10 and 11, it looks like 7,014,383 thousand.

28 THE COMMISSIONER: Well, I
29 think we'll let Mr. Marshall handle that when Mr. Trusty
30 arrives. Thank you very much, though.

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MR. GIBBS: I thought he wanted
some help from me.

MR. MARSHALL: Mr. Gibbs and I
help each other all we can, sir.

THE COMMISSIONER: All right,
carry on, Mr. Hemstock.

WITNESS HEMSTOCK: The sub-
stantial difference in cost among the alternative corri-
dors as compared to the proposed pipeline along the
prime route is clearly a matter of concern to the con-
sumers of natural gas in both United States and Canada.
First, once the line is built and operating, the greater
capital and operating costs of the alternatives would
translate directly into increased transportation rates to
the consumers. Second, the magnitude of the capital cost
of at least the Fort Yukon and Fairbanks corridors,
raises a serious question as to whether pipelines along
those routes could be financed. In view of the urgent
need of the gas-consuming public for access to the
supplies of gas available in the Arctic areas of Alaska
and the northwest portion of Canada, this difficulty or
perhaps inability is a substantial consideration. Fin-
ally, the offshore corridor was rejected in substantial
part upon the basis that problems of access --

THE COMMISSIONER: I think
"would", "would mean", is that --

A I think that that's
correct -- would mean in difficulties of repair of any
problem with the line, in ice-covered waters, which would
render service uncertain. This, too, is a highly

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1 important factor to be considered by the consumers of
2 the gas.

3 MR. MARSHALL: Mr. Hemstock,
4 we now turn to the "Environmental Considerations".

5 A The inter-relationship of
6 the environment and the proposed pipeline system along
7 the prime route has been presented in Section 14(d),
8 the environmental statement, Exhibit 57. The general
9 objectives of the Arctic Gas environmental research
10 program as stated in that exhibit was to determine the
11 present environmental setting; to determine the nature
12 and the duration of environmental changes that might
13 result from the construction and operation of a northern
14 natural gas pipeline, and to devise procedures for in-
15 corporation of biological knowledge into engineering,
16 construction, and operation plans to provide the
17 highest possible degree of protection to the environment.

18 Environmental work performed by
19 and for Arctic Gas has covered the entire length of the
20 proposed pipeline system for the prime and interior
21 routes, which include Yukon Territory and the Northwest
22 Territories, the Provinces of Alberta, Saskatchewan and
23 British Columbia, and the State of Alaska.

24 Within Section 14(e) (1),
25 alternative corridors, Arctic Gas has presented the
26 inter-relationship of the environment and the pipeline
27 system along the alternative routes and corridors by
28 first describing the environmental setting and then by
29 assessing the environmental impacts associated with
30 construction, operation and maintenance. Sepcific impacts

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1 for a pipeline system constructed along any one of the
2 routes or corridors are similar in nature but differ
3 in degree or severity based on the specific environment
4 associated with the particular route or corridor. These
5 differences have been cited within Section 14(e) (1).

6 The environmental impacts are
7 covered next. A principal impact of the pipeline
8 system would be on the terrain, which includes the
9 vegetation, underlying permafrost soils, and the rivers,
10 lakes and streams. The construction and operation of
11 the proposed pipeline along any of the routes or
12 corridors requires that this impact be minimized by
13 using all possible design measures and construction and
14 operation procedures to prevent vegetation damage,
15 erosion, heaving, settlement or slope instability, and
16 siltation of water courses. Those measures are neces-
17 sary also to preserve the integrity of the pipeline.
18 An even more fundamental procedure utilized for mini-
19 mizing physical impact is that of route selection. The
20 route chosen attempts to follow favorable topography,
21 cross relatively stable ground, and avoid any slopes
22 considered marginally stable.

23 Ditching will rearrange sur-
24 face soils and sub-surface material causing temporary
25 minor permafrost regression, and some alteration of
26 micro-drainage patterns. Winter construction, however,
27 will limit terrain disturbance caused by movement of
28 construction equipment on the right-of-way. Mechanical
29 stabilization techniques, including refrigeration of
30 gas and implementation of drainage and erosion control

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measures will reduce to minor proportions the overall impact of construction. Disturbed areas will be revegetated by seeding and fertilizing.

Borrowing or quarrying granular material for construction will cause permanent but localized changes to the natural setting. Landscaping of project facilities and borrow sites following their use will restore many of these areas to nearly natural terrain conditions.

Temporary or local impacts on the atmosphere of the area can be expected during the construction and operation phases of the project from dust, noise, exhaust emission, heat, smoke, chemical vapours and water vapour. The influence of these factors will be minor and local in extent.

The project will influence both the surface and sub-surface hydrological regimes through minor surface disturbance of vegetation, soils, or permafrost, or by slight elevation of the permafrost table under gravel pads, road beds and around the low temperature pipeline. Revegetation, drainage control, scheduling of operations and the proper placement of project installations will reduce the extent and significance of these changes.

Removal of water for construction and for human use will be regulated according to the capacity of the source to sustain required withdrawals without a harmful effect on aquatic resources. Stream and lake water quality will be maintained by the use of sewage treatment facilities and strict control of other project-related sources of potential contamination.

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Disturbance of tundra vegetation will be restricted largely to the pipeline ditch, facility pads, and borrow areas. Under certain conditions, tundra can be mechanically removed and then replaced on the pipeline crown and other disturbed areas to hasten the re-establishment of a permanent vegetation cover. Research is presently being conducted to determine more precisely the value of this technique. Snow and ice roads on the right-of-way will protect underlying vegetation from vehicular movement. In the boreal forest area, disturbed soil on the ditch crown and other areas can be revegetated with a mixture of native grasses and improved varieties of other closely related grass species to control erosion and promote re-establishment of the natural soil energy balance.

The judgment of the aesthetic impact of the pipeline and its support facilities can only be subjective, based on personal evaluation and conditioned by the locale and the expectations of the viewer. In the Boreal Forest region, the unavoidable pipeline right-of-way clearing may be obtrusive to some, while to others the revegetated strip will provide a visual relief from unbroken forest canopy. In tundra regions, the revegetated ditch crown will blend with the environment and will be absorbed by the vast scale of the open landscape. The degree of direct visual impact depends on the extent of public exposure. In the remote and largely undeveloped territory through which it passes, the pipeline development will be seen by

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1 few people, and the impact on the viewing public will
2 be of minor proportions.

3 From an archaeological point of
4 view, the general location of the alternative routes and
5 corridors, north of the 60th Parallel is associated with
6 the route travelled by many prehistoric migrants, as
7 well as with sites of later influences and technical
8 advancements. Archaeological study along any one of the
9 routes during construction may contribute to man's under-
10 standing of these prehistoric people through increased
11 knowledge of changes in their environment and their
12 adaptation to these changes. Further field surveys, more
13 detailed classification of the route into priority
14 sections and continuous surveillance during pipeline con-
15 struction would be carried out to detect archaeological
16 sites, regardless of which alternative was used.

17 Another principal consideration
18 is whether the pipeline system would have a significant
19 effect upon wildlife. Again, the procedures used for
20 route selection, design, construction and operation of
21 the system would result in the minimization of this
22 impact.

23 Wildlife investigations show
24 that the construction and operation of the pipeline
25 facilities along any of the alternatives would have
26 only limited impact on most mammal species. Important
27 species including caribou, grizzly bear, polar bear,
28 Dall sheep, muskox and fur-bearers have been studied
29 extensively. Relatively minor impact upon these
30 animals is predicted along the prime route partly

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1 because most of the construction will occur in winter,
2 partly because observed reactions to human presence
3 and noise have been relatively minor, and partly because
4 relatively little habitat will be disrupted. The
5 impact on these mammals if the pipeline system were
6 constructed along the interior route increases due to
7 the limited flexibility of line routing within mountain-
8 ous terrain and due to differing construction, timing
9 and methods. Construction through the Fairbanks and
10 Fort Yukon corridors may result in impacts of the
11 nature expected along the interior route due to the
12 similarity of terrain. Recreational hunting and
13 trapping by construction and on-duty operational per-
14 sonnel will be prohibited and are not expected to have
15 any measurable impact.

16 Disturbances related to the
17 pipeline along the prime route are not expected to
18 affect bird populations adversely, so long as the
19 recommended protective measures are followed. These
20 measures include:

- 21 1. Major construction in the north will take place
22 during the winter when most birds will be absent from
23 the construction area, and operations and maintenance
24 activities will be confined to a narrow corridor.
- 25 2. Critical areas for waterfowl and rare and endangered
26 species have been identified; special precautions such
27 as scheduling of construction, route selection, regula-
28 tion of aircraft approach distances or altitudes, and
29 education of construction personnel will be taken to
30 avoid or reduce disturbance of these birds.

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1 While other routes may avoid
2 bird concentrations along the Yukon coast, they may
3 encounter other sizeable or rare and endangered bird
4 populations in regions such as the Brooks Range, Yukon
5 Flats, or the offshore areas. While similar techniques
6 could be applied for the protection of these species,
7 the restrictive nature of such terrain makes the opera-
8 tions and management more difficult.

9 Fish populations in water
10 bodies along the prime route will be little affected
11 by the project, since the route avoids critical fish
12 habitat. Construction procedures will prevent serious
13 siltation of gravel beds, significant alteration of
14 drainage patterns, or blockage of streams.

15 Moreover, construction opera-
16 tions will be scheduled to avoid conflict with fish
17 populations, and near-natural stream bottom conditions
18 will be maintained or re-established. Emphasis on
19 erosion control programs, prevention of permafrost de-
20 gradation, maintenance of natural drainage patterns and
21 slope stability and revegetation will limit siltation.
22 Precautions will be taken to prevent run-off from borrow
23 pits and other disturbed areas from entering water
24 courses. Alternative routes and corridors through
25 mountainous areas that are encountered along the Fort
26 Yukon, Fairbanks, and interior alternatives restrict
27 the lateral flexibility of routing. Since major over-
28 wintering and spawning grounds are found throughout
29 the mountainous areas, the possibility of disturbing
30 fish is therefore greater. The prime route offers

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1 greater flexibility in crossing streams and avoiding
2 critical habitat.

3 Q Mr. Hemstock, you can
4 return now to the consideration of "Socio-Economic
5 Factors relative to the alternative corridors".

6 A Sub-section 1.7 of Section
7 14(e) (1), Exhibit 59, presents a discussion on the
8 socio-economic factors relative to the interior route
9 and to the offshore, Fairbanks, and Fort Yukon corridors.
10 It emphasizes factors relative to the people of
11 Northern Canada and Alaska. The socio-economic analysis
12 relative to the prime route, in Section 14(c), Exhibit
13 56, in many instances refers to general effects of in-
14 dustrial activity upon less developed economies, with
15 emphasis upon gas pipeline and related developments, and
16 upon policies which are to be adapted by a pipeline
17 organization to aid further progress toward desirable
18 social and economic goals in the areas traversed. Such
19 considerations are not generally specific as to site,
20 and are therefore applicable to the alternative corridors.

21 As to the Fairbanks and Fort
22 Yukon corridors, the effect of the use of those routes
23 would eliminate the bulk of the pipeline facilities
24 which would be otherwise located in the Northwest
25 Territories, if the prime route or the interior route
26 or the offshore corridor were utilized. This is because
27 the connection between the supply lines bringing gas
28 from Alaska and from the Mackenzie Delta would be moved
29 from a point just south of the Mackenzie River Delta
30 to a point in the Yukon Territory near Watson Lake or

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1 Dawson, respectively. The result of this change is
2 that there would be no line in the Mackenzie River
3 Valley while the supply line from the Mackenzie River
4 Delta producing areas would travel only a short distance
5 from the south end of the Mackenzie River Delta, before
6 entering the Yukon Territory and proceeding in a gener-
7 ally southerly direction through the Yukon Territory,
8 Accordingly, this is one clear distinction between those
9 routes which would utilize the Mackenzie River Valley
10 -- that is the prime, offshore and interior -- and those
11 which do not (Fairbanks and the Fort Yukon).

12 Primary employment relates to
13 employment directly by the proposed pipeline enterprise,
14 in the construction or the operations phases of activity.
15 Construction, and operations and maintenance employment
16 by a pipeline enterprise is a function, in substantial
17 part, of the length of the line. The construction
18 work force needed in Canada for construction along the
19 interior route is approximately the same as that re-
20 quired for the prime route. The Fairbanks and Fort
21 Yukon corridors are much longer than the prime route,
22 with a substantial portion of that extra mileage in
23 Alaska. The differences in total work force needed
24 in Canada for the Fairbanks and Fort Yukon corridors
25 may not be large, but the duration that the total
26 work force is required is greater, due to the additional
27 summer construction that would be required with these
28 two corridors.

29 In any analysis of effect on
30 employment in the Canadian Northwest, one must consider

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1 the relatively small size of the labor force available
2 in the Yukon Territory and the western part of the
3 Northwest Territories, compared to the total labor force
4 needed. Arctic Gas will make every effort to attract
5 and train all able and willing northern residents who
6 are available. Each alternative routing offers the
7 potential of maximizing regional construction employment
8 in terms of the available regional labor supply.

9 It's obvious, however, that the
10 Fairbanks and Fort Yukon corridor lie near different
11 population centres than do the prime and interior
12 routes. Both the Fairbanks and Fort Yukon routes in-
13 volve pipelines which pass near Whitehorse and Dawson,
14 as well as other smaller communities in the Yukon, but
15 do not involve as many of the Mackenzie River Valley
16 communities of the Northwest Territories. More native
17 people are located along the prime and interior routes
18 than along the Fairbanks and Fort Yukon corridors.

19 There are two aspects of
20 employment impacts which bear a close relationship
21 to the operations phase of a pipeline -- employment
22 associated with operations and maintenance of the pipe-
23 line itself, and employment associated with gas explora-
24 tion and development and operations. Gas exploration,
25 and resultant development, is substantially affected by
26 the availability of a pipeline since there is little
27 incentive to cause exploration or development drilling
28 without the existence or prospect of an effective means
29 of transportation.

30 Of the

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alternatives, the Fairbanks and Fort Yukon corridors would require somewhat more operations and maintenance staff; the interior route, just slightly more; and the offshore alternative approximately the same amount as compared with the prime route. Again, there is a substantial difference in the location of the corridors and their proximity to populated areas. It is anticipated that this factor is much more important relative to operational employment than to construction employment, since many northern residents can be expected to be desirous of working relatively near their homes over a sustained period of operating years, while paying somewhat less attention to such factors over the relatively few months of the construction period.

In terms of total employment in the north during the operations phase, however, the personnel requirements for gas field exploration, development and operations far exceed those associated with pipeline operations and maintenance. Each of the alternative corridors involves a line into the Mackenzie Delta producing area and thus would produce equivalent gas field employment in that area. The prime route passes through areas which are rated to have a higher overall potential for additional oil and gas discovery and development, outside the Mackenzie Delta area, and accordingly can be expected to produce greater activity. In view of that fact, it is likely that the prime route will result in overall primary employment during the operations phase which is at least equal to and probably greater than any of the other corridors.

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1 Secondary employment refers to
2 employment which is not directly in jobs with the pipe-
3 line or gas exploration and production associated with
4 the pipeline, but is instead a result of the general
5 increase in income and resultant business activity gener-
6 ated by the pipeline activities. Such induced or multi-
7 pplier effects would be about equal for the construction
8 phase of the pipeline along the prime route, offshore
9 corridor and interior route, and slightly greater for
10 the Fairbanks and Fort Yukon corridors.

11 It can be argued that because
12 the populated portions of the Yukon are more mature,
13 in economic terms, the ultimate value of secondary
14 benefits would be lower in that sub-region than would be
15 the ultimate value of a secondary impact in the less
16 mature Mackenzie Valley. Without a major new develop-
17 ment, the Mackenzie Valley region faces a steady deter-
18 ioration of the present precarious economic and social
19 situation. The Yukon, on the other hand, has a relative-
20 ly more well-developed infra-structure with a significant
21 level of economic activity in the service and resource
22 sectors.

23 A natural gas pipeline along
24 any of the routes offers the potential of gas supply to
25 communities within economic reach of the pipeline. Whe-
26 ther or not there would be the ability to support the
27 lateral pipeline and the gas distribution system which
28 would be necessary, involves a comparison of likely
29 costs under such systems with energy costs using exist-
30 ing and likely future alternative energy sources. The

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1 prime route, offshore corridor, and interior route would
2 pass relatively near the Mackenzie River Valley communi-
3 ties, with the major difference between them being the
4 proximity to Old Crow and Aklavik. The Fairbanks and
5 Fort Yukon corridors, on the other hand, pass near most
6 of the major communities in the Yukon, including White-
7 horse.

8 Q Mr. Hemstock, would you
9 turn now then to a consideration of the conclusions
10 reached as a result of the alternative corridor studies
11 carried out on behalf of Arctic Gas?

12 A Yes sir. In conclusion,
13 Arctic Gas undertook its studies which led to its
14 choice of pipeline routing with full knowledge of the
15 importance of consideration of all the feasible alter-
16 natives. The five major corridors, and the routing
17 variations within each of them were derived from a
18 sifting of relevant geographic, engineering, and environ-
19 mental information.

20 Comparison of the prime
21 route, the offshore corridor, and the interior route
22 shows that they have substantial basic similarities
23 since each utilizes the same routing through the
24 Northwest Territories of Canada. The offshore corri-
25 dor has been eliminated, however, because it is unde-
26 sirable in terms of service continuity and cost, and
27 offers no overall advantage in environmental terms.

28 As between the two corridors
29 which do not utilize the Mackenzie River Valley, it
30 is quickly apparent that the Fairbanks corridor use
would result in the longest total pipeline system, and

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1 would produce the highest capital and unit transportation
2 costs. It would put Arctic natural gas near the
3 cities of Fairbanks, Alaska, and Whitehorse, Yukon
4 Territory, and additional small communities; but would
5 remove such gas from near many Mackenzie River Valley
6 communities and the Northwest Territories -- of the
7 Northwest Territories. The Fairbanks corridor would
8 also generally follow the route of the Trans-Alaska
9 Oil Pipeline to near Fairbanks, and thereafter generally
10 follow the Alaska Highway through Alaska and the Yukon
11 Territory. The concept of following an already distur-
12 bed pathway is not necessarily beneficial, even in
13 environmental terms. It depends upon the nature of
14 the area traversed, how close the two disturbances can
15 be located together, and whether there are other con-
16 flicting environmental values. The Fairbanks corridor's
17 greater length has environmental significance, as does
18 the fact that it requires a long gas supply line from
19 the Mackenzie River Delta producing areas through the
20 Yukon, through partially undisturbed areas. Further,
21 the Fairbanks corridor does not traverse areas with as
22 high a degree of gas production potential as does the
23 prime route. In fact, there is a substantial possibility
24 that if the Fairbanks corridor were utilized, there
25 would later need to be a need to construct some or
26 all of the northern portion of the prime route to connect
27 additional gas supplies. In such event, the purpose
28 sought to be served by adopting an alternative route
29 in the first place would then be frustrated, or at least
30 in part, unless the new gas supply were to be left
unconnected. Additionally, there is substantially

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1 less certainty that a pipeline along the Fairbanks
2 corridor could be completed on the desired time schedule
3 than there is relative to the prime route.

4 These observations relative
5 to the Fairbanks corridor also apply to the Fort Yukon
6 corridor, with certain exceptions. One difference is
7 that the cost would be substantially less than for the
8 Fairbanks corridor, but still greatly in excess of the
9 prime route. The Fort Yukon corridor would bring gas
10 near the Town of Fort Yukon, Alaska, but not the City of
11 Fairbanks, and other Alaska Highway villages located
12 west of Whitehorse. The Fort Yukon corridor does not
13 follow the routes of other uses as much as does the
14 Fairbanks corridor. Like the Fairbanks corridor, the
15 likelihood of timely completion is less than with the
16 prime route, and the need for future North Slope supply
17 lines would not, in all probability, be avoided.

18 Both the Fairbanks corridor
19 and Fort Yukon corridor would generate more employment
20 in the north, but this in turn would be reflected in
21 a greater cost to consumers and/or lower well-head
22 gas prices. The employment differential is not sub-
23 stantial, relative to the employment created in the oil
24 and gas production areas, and in secondary and indirect
25 employment which a pipeline along any of the routes
26 will create.

27 On the basis of all factors,
28 Arctic Gas concluded that a routing which utilizes the
29 Mackenzie River Valley of Canada offers the greatest
30 net benefit to both Canada and United States. That

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1 more direct routing gives clear benefits to the gas
2 consumers and producers of both countries, in terms of
3 capital and operating costs, economic access to addition-
4 al gas reserves, and less energy usage. These costs
5 and gas supply advantages have, of course, further impli-
6 cations in the market areas in terms of both air pollu-
7 tion and sufficiency of energy supply to further both
8 the economy and the public health and safety of market
9 areas. As against such advantages, Arctic Gas has been
10 unable to determine any substantial net advantages which
11 would accrue to the Canadian Northwest which would
12 justify the loss of the market area advantages which
13 would occur if the Fairbanks or Fort Yukon corridors
14 were chosen.

15 The choice, then, is between
16 the prime route and the interior route. The differences
17 between the routes lie in the area from Prudhoe Bay to
18 a point near the Yukon-Northwest Territories boundary,
19 south of the Mackenzie River Delta. The interior route
20 is longer over this area and traverses two mountain
21 ranges. Accordingly, it is substantially more expensive
22 to construct and to operate. In addition, the North
23 Slope and offshore areas are rated as having the highest
24 potential for future additional gas supply, and the
25 prime route offers automatic access without main pipeline
26 extensions to those areas. The interior route, on the
27 other hand, lies well away from the Arctic coast, except
28 at Prudhoe Bay, although not nearly as far away as the
29 Fort Yukon and to even a greater extent, the Fairbanks
30 corridor.

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Arctic Gas' conclusion, in light of the environmental findings by experts in each discipline, is that none of its potential routes would have substantial adverse effect upon the wildlife, aquatic resources, soil or vegetation of the regions affected, and that the prime route would have the least effect, in part because it lies on the generally less productive Arctic coast, and in part because it is the shortest and thus traverses the least territory.

In Alaska, the prime route passes several miles south of the Village of Kaktovik, which is located on the Arctic coast, while the interior route passes a longer distance north of Arctic Village. In Canada the prime route passes near the Town of Aklavik, while the interior route passes a few miles from the Village of Old Crow. It is not anticipated that there would be significant net differences in construction or operational employment, or economic activity because of the differences in villages near the route, even though the interior route would be more costly to construct and operate with a slightly larger labor force. The indirect effects of a pipeline along either route could be expected to be similar overall, and in neither case would significant adverse effects upon the social system of the Canadian Northwest be expected. Further, construction on either route would not interfere with the ability of the people who live in the general vicinity to carry on traditional life styles, if they choose to do so.

On balance, Arctic Gas has

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1 concluded that although a pipeline along the interior
2 route would be feasible and beneficial to both Canada
3 and the United States, the use of the prime route
4 clearly gives more net benefits, particularly to the
5 prospective consumers of Arctic natural gas. Those
6 consumers would receive more direct access to more pro-
7 lific areas of gas supply and would benefit because of
8 the cost savings associated with the prime route.

9 MR. MARSHALL: Mr. Commissioner,
10 that concludes the direct evidence of Canadian Arctic
11 Gas pertaining to this subject.

12 THE COMMISSIONER: All right,
13 well we'll begin cross-examination this afternoon.

14 Before we adjourn for lunch,
15 Mr. Hemstock, back at pages 6, 7, and 8, when you were
16 dealing with the advantage in having a pipeline route
17 that was located near to areas of potential gas
18 reserves, you said that in Canada, or at least in the
19 Yukon and the Northwest Territories, the Mackenzie
20 Valley-Beaufort basin was ranked No. 1. You said the
21 Eagle Plain basin, which we now understand is south
22 of Old Crow, was ranked No. 2. Then you said that
23 there were certain provinces, by that word we are to
24 understand that you mean potential hydrocarbon areas,
25 that are ranked third. You didn't say where those
26 third ranked areas were.

27 A I'm not sure of the
28 ranking, but I could just list the other areas that
29 have potential. One of them is the Peel Plateau or
30 on our map it's called the Peel Plain, and perhaps Mr.

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1 Williams could indicate that on the wall map there.
2 And another one that is listed as the Mackenzie Plain
3 on our map is essentially the -- generally the valley
4 of the Mackenzie River from the Peel Plain all the way
5 up to about the Liard River. That, of course,
6 in that area --

7 Q From the Mackenzie Delta
8 to Fort Simpson.

9 A No, this particular
10 province, in our terminology, runs from the Peel Plain
11 up the river to about the Liard, and it's in that
12 particular province that the field of Norman Wells is
13 located.

14 Q So am I -- have I been
15 sitting here too long? Doesn't that take us to Fort
16 Simpson?

17 A Oh yes, but not from
18 the -- not quite from the delta.

19 Q Oh, I see, yes.

20 A Yes.

21 Q And those are what you
22 meant on page 7 when you said,

23 "The provinces of potential gas supply which
24 are in the third level ranking in Northwest
25 Canada."

26 A Yes.

27 Q Now, just turning to page
28 6, you said,

29 "In Alaska the Arctic slope province, province
30 being potential hydrocarbon area, is clearly the

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1 area of top gas prospects by any measure."

2 Now that includes Prudhoe Bay oil and gas area. When
3 you refer to that Arctic slope province, do you include
4 petroleum reserve No. 4 on the Arctic coast of Alaska,
5 which is generally around Barrow?

6 A The westerly extension of
7 that province would go into the naval petroleum reserve
8 No. 4, and as I understand it, it goes basically from
9 the foothills of the Brooks Range to the coastline,
10 and of course also there are sedimentary deposits off-
11 shore of the same geological significance.

12 Q Well, when Arctic Gas was
13 considering these various routes, was the accessibility
14 of the line from Prudhoe Bay to the oil and gas reserves
15 in
/naval petroleum reserve No. 4 taken into account?

16 A It would be taken into
17 account, but not in a very important way because Prudhoe
18 Bay itself has sufficient, has very large reserves and
19 certainly sufficient to justify the construction of a
20 pipeline. The idea is simply that if a major trunkline
21 is being built, it would seem logical to build it towards
22 what you expect to be, say, the centre of gravity of the
23 potential oil and gas discovery.

24 THE COMMISSIONER:

25 I understand that. Well,
26 let me put it this way, and I don't ask you to answer
27 this now but you might consider it, Mr. Marshall.

28 If -- as I understand it, President Ford has asked
29 Congress to release petroleum reserve No. 4. If that
30 gas were brought along the Prudhoe system, Prudhoe
Bay and then along the north coast down the Mackenzie

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1 Valley, it might lead conceivably to early looping
2 of the supply line from Prudhoe Bay and Mr. Horte has
3 already indicated that there would be looping, that is
4 a second gas pipeline down the Mackenzie Valley might
5 mean additional looping of the Mackenzie Valley trunkline,
6 that is conceivably a third line early on. I would
7 -- I just ask Mr. Marshall to take that under advisement
8 and to let me know if that is a matter that this panel
9 is competent to discuss this afternoon or later on this
10 week.

11 Well, we'll adjourn then until
12 2:30 for cross-examination. 153)
13 (EVIDENCE ON ALTERNATIVE ROUTES & CORRIDORS EXHIBIT
14 (PROCEEDINGS ADJOURNED TO 2:30 P.M.)

15 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

16 THE COMMISSIONER: We'll call
17 our hearing to order, ladies and gentlemen. Mr. Gibbs,
18 if you wish to begin?

19 MR. GIBBS: Mr. Marshall has
20 a task he wants to perform.

21 MR. MARSHALL: I'd like to
22 introduce a member of the panel who has just joined
23 them, Wayne B. Trusty, and briefly review his qualifi-
24 cations. I have given a copy of his resume to Miss
25 Hutchinson, and she will be marking it as an exhibit.

26 WAYNE B. TRUSTY, sworn:
27 DIRECT EXAMINATION BY MR. MARSHALL (CONTINUED):

28 Q Mr. Trusty, you're the
29 president of Wayne B. Trusty & Associates Limited and
30 are acting as economic advisor to Canadian Arctic Gas?

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A That's correct.

Q You received a B.A. and
an M.A. in economics from the University of Western
Ontario in 1965 and '67 respectively?

A That's correct.

Q Since then you've been
engaged professionally as an economist, in 1967, with
Acres Research & Consulting Limited; in 1968 and 1969
you were an economist at Stanford Research Institute in
California.

A That's correct.

Q In the summer of 1969 you
were involved in research at the Pennsylvania Transpor-
tation & Traffic Safety Centre at the University of
Pennsylvania.

A That's right.

Q From 1969 to '71 you were
senior economist with Hedlin Menzies & Associates
Limited, a division of Acres Research & Consulting
Limited.

A Yes sir.

Q 1971 and 1972 you were
senior consultant to Hopkins Hedlin Limited involving
economics communications.

A Yes sir.

Q And in 1972 you formed
your own consulting firm.

A That is correct.

Q And I understand that
since October of 1973 you've been an economic consultant

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1 to Arctic Gas.

2 A That's right, yes sir.

3 Q And what has your area of
4 responsibility been with Arctic Gas?

5 A My areas of responsibility
6 have included the regional socio-economic examinations
7 that were being made both internally and by other con-
8 sultants, and the national economic analyses that were
9 being undertaken.

10 MR. MARSHALL: Thank you, Mr.
11 Trusty. Mr. Commissioner, I understand that Mr. Trusty
12 was sworn in the Inquiry at Hay River. There were a
13 couple of other matters that you asked about, sir.

14 You asked me if we could
15 provide a map that would show these various areas for
16 potential oil and gas exploration. There is such a
17 map, it's the first page in Exhibit 60, which is the
18 drawing for alternative corridors and systems of
19 transportation, and I'll have a copy of that run off
20 for you this afternoon, sir.

21 You asked as well about the
22 1974 capital cost estimate for the prime route, and
23 Mr. Dau has been able to check that, I believe.

24 Q Could you speak to that,
25 Mr. Dau? Just to clear that point.

26 WITNESS DAU: Yes, it's listed
27 in Section 10, and the Canadian facilities only under
28 Tab "Base Case", escalator cost total slightly over
29 \$7 billion, 7,014, the 1974 escalated cost.
30

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1 THE COMMISSIONER: So if all
2 of the estimated costs for each route are examined,
3 what page is that table on? Page 19, the cost of the
4 prime route, the first figure there that is \$5,742,700,000
5 that, you say, is 7,014,000,000.

6 A No sir, that's not quite
7 correct, sir. The cost I just gave you of \$7 billion
8 is the Canadian facilities only, and I'm sorry, I don't
9 have the U.S. facilities broken out as such in Alaska.
10 I'm waiting to get that.

11 Q So the figure of 5,742,000,000
12 would, costed to 1974, be in excess of 7 billion.

13 A That's my understanding,
14 sir, yes.

15 Q And all of these other
16 figures would have correspondingly be enhanced.

17 A Yes. You probably recall,
18 sir, I believe we did mention in a previous session
19 that the cost estimates are not made on exactly the
20 same basis. There was an engineering format that we
21 -- that was used within Northern Engineering that cal-
22 culated interest during construction on a rather simple
23 method. Arctic Gas has elected to go to the more
24 complex method utilizing a special computer program, and
25 the numbers do not track exactly. They are not off a
26 significant amount, not within the context of what we're
27 doing but they will not track exactly.

28 THE COMMISSIONER: All right.
29 Well, is that all?

30 MR. MARSHALL: Thank you, sir.

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1 MR. GIBBS: I wonder if my friend,
2 Mr. Marshall, could enlighten me as to which of these ^{ent} emin/
3 gentlemen I should address my questions to?

4 MR. MARSHALL: Mr .Hemstock.

5 MR. GIBBS: Mr. Hemstock.

6 C ROSS-EXAMINATION BY MR. GIBBS:

7 Q Mr. Hemstock, there have
8 been in addition to the alternates you have proposed
9 two more put forward by Canadian Arctic Resources Commit-
10 tee. Are you familiar with those?

11 A I'm familiar with just
12 one of them,sir.

13 Q One is called the edge
14 of the shield corridor, which runs down to Great Slave
15 Lake, Great Bear Lake, the Wood Buffalo Park, and probably
16 the Cold Lake Bombing Range. Have you looked at that at
17 all in any of your studies?

18 A No, we have only looked
19 at that in a very general way. We have not made any
20 detailed studies of that.

21 Q You have no capital costs
22 or operating and maintenance costs for that?

23 A No, we haven't.

24 Q And would the same answer
25 apply to the other route that was put forward by Mr.
26 Anthony's client? East of the Franklin route?

27 A Yes, that would apply to
28 that ,sir.

29 Q And you then are prepared
30 only to speak to the alternates which are listed in your

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1 application material?

2 A We could make some
3 general comments about those routes which are proposed
4 east of the Franklins. I think both Dr. Clark and
5 Mr. Williams could comment on the, in a general way, on
6 the difficulties which we see with regard to those
7 routes. For one thing, we would still see the
8 Mackenzie River as the major transportation artery which
9 would support them and we see difficulties in the
10 construction of access roads over to that area. We
11 would see the same kind of difficulties in the operations
12 and maintenance of such a pipeline away from already
13 established traffic ways, such as the Mackenzie River
14 provides. I think perhaps Mr. Williams may have some
15 comments, too, on the kind of construction problems
16 which might be different than the proposed prime route.

17 Q Well, if he has some would
18 he please make them?

19 WITNESS WILLIAMS: We certainly
20 haven't looked at this route very closely, but the
21 author of the suggestion suggests that it's about the
22 same length. We did run a quick check on that and found
23 it to be about 80 miles longer than the route applied
24 for. We really can't see how that could be construc-
25 ted without an all-weather road constructed adjacent
26 to the line because of the access problems mentioned by
27 Mr. Hemstock. But we certainly haven't looked at it
28 in any great detail.

29 Q Was there someone else
30 on the panel wanted to speak to those two routes?

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1 WITNESS HEMSTOCK: I think we
2 have no further comments.

3 MR. GIBBS: All right, sir.

4 Q Looking, Mr. Hemstock,
5 at your Fairbanks corridor, like the prime route the
6 two supply lines, one from Prudhoe Bay and one from
7 the Mackenzie Delta, are each designed as 48-inch lines,
8 are they?

9 A That is correct, yes.

10 Q And each designed
11 initially to carry 2½ billion cubic feet.

12 A Yes.

13 Q Per day.

14 A Yes.

15 Q And each capable when
16 fully powered of carrying 4½ billion cubic feet per
17 day.

18 A That is correct.

19 Q And Mr. Hemstock, are
20 you confident that this supply exists in the delta
21 and in Prudhoe Bay to fill both of those supply lines
22 at full capacity?

23 MR. MARSHALL: That is 2½ bil-
24 lion figure?

25 MR. GIBBS: No, 4½ billion.

26 A I believe that the
27 reserves are not presently available to fill that
28 pipeline.

29 Q In Prudhoe Bay either?

30 A I believe that's correct.

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1 I am not qualified to talk about the reserves and
2 capacity of these lines. I could perhaps ask Mr.
3 Dau to come in.

4 Q Well, I'm sure someone
5 on this panel must be able to explain to the design
6 of those supply lines.

7 WITNESS DAU: The two lines,
8 Mr. Gibbs, are selected at 48-inch on the same basis
9 as the prime case or the base case. There was no
10 attempt made to design it any other way. It's just
11 that we followed the same ground rules as they were
12 for the base case.

13 Q And that basis is that
14 the gas exists in Prudhoe Bay to fill the 48-inch line
15 within a reasonable buildup period of years. Is that
16 correct?

17 WITNESS HEMSTOCK:
18 A That's my understanding,
19 sir. Again I can't speak to the reserves.

20 Q Well, sir, someone must
21 be able to speak to these things. This panel is here
22 to talk about the size of these pipelines and the
23 alternate routes. Is there anyone else, Mr. Dau, on
24 the panel that can speak to the -- with confidence
25 that there are the reserves in Prudhoe Bay to fill
26 that lateral when fully powered?

27 MR. MARSHALL: Sir, we haven't
28 included a reserves expert on the panel. As you can
29 see, we've ended up with a pretty fair-sized panel
30 as it was trying to get fairly broad representation
of various subject areas that might arise at this

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1 session of the hearing here in Whitehorse, but we don't
2 have on the panel someone who is expert in reserves.

3 MR. GIBBS: Well, Mr. Commission-
4 er, if we are to make comparisons between these alter-
5 nate corridors and the prime route, surely the design
6 is one of the comparisons; and if design can only be
7 supported with the evidence of an expert in reserves,
8 it would seem to me, with respect, that that person
9 should come forward, because those design sizes ob-
10 viously affect the capital costs and the operating and
11 maintenance costs, which are questions you yourself,
12 sir, were interested in this morning.

13 THE COMMISSIONER: Well, if
14 there's no one capable of answering the question,
15 there's no one capable of answering the question. We
16 can't do anything about that here and now. What
17 page was it that this appeared on? I don't remember.

18 MR. GIBBS: Well, it appeared
19 really, sir, it's the basis of the design, why two
20 48-inch lines, and then you get over to page 19 where
21 they talk about capital costs. Also, sir, it affects
22 the question which is present in everyone's mind, of
23 when under the Franklin -- under the Fairbanks corridor
24 looping of the main line might commence which ties
25 back directly to the confidence in the reserves to
26 fill the line when fully powered.

27 But sir, if no one can answer
28 it, there's really no point in pursuing it but I
29 wonder how we can really get a comparison going with
30 that kind of information missing.

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1
2 THE COMMISSIONER: This document
3 that Mr. Hemstock read this morning, like the other
4 evidence we have heard at Yellowknife, indicates that
5 Arctic Gas intends within four or five years of the
6 pipeline being built to have the Prudhoe Bay leg and
7 the Mackenzie Delta leg operating at full capacity, and
8 both supply legs are capable of carrying at full
9 capacity, 4½ billion cubic feet of gas a day. That --
10 is that the position?

11 MR. MARSHALL: I think not, sir.
12 I think the four or five-year buildup is to a capacity
13 on the trunk system from Travaillant Lake down of 4.5.

14 THE COMMISSIONER: Yes, yes,
15 that's right; and 2 3/4 on each supply leg?

16 MR. MARSHALL: 2½.

17 THE COMMISSIONER: 2½, all
18 right. Well, I think that's all these gentlemen are
19 saying, is whatever we were discussing back in May,
20 they are still relying on the figures they put for-
21 ward at that time.

22 MR. GIBBS: Q And Mr.
23 Dau, your -- the basis of your figure is, that is of
24 your design, is that there will be sufficient to oper-
25 ate both those supply lines at capacity at some stage.

26 WITNESS DAU: Yes, with
27 respect to the location of compressor stations and so
28 on, yes.

29 Q Well, with respect
30 to line sizes as well.

A Yes.

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1 Q You surely don't put in a
2 48-inch line without expecting some way to put 4½ billion
3 cubic feet of gas through it. That's so, isn't it?

4 A No, I would disagree.
5 You could put in a 48-inch pipeline with something less
6 than an ultimate design of something less than 4½ billion
7 cubic feet.

8 Q Oh, you could, but you
9 didn't.

10 A No.

11 Q You designed it under that
12 confident expectation that each of those supply lines
13 would have at sometime in the future carry 4½ billion
14 cubic feet a day.

15 A That is correct.

16 Q And whether you can talk
17 about reserves or not, someone has indicated to you their
18 belief that the reserves are there, or will be there
19 to maintain that daily deliverability.

20 A That is so.

21 Q Both in Prudhoe Bay as
22 well as in the Mackenzie Delta.

23 A Yes sir.

24 Q And so then it follows that
25 at some stage when the total of those two laterals
26 exceeds 4½ billion cubic feet, the mainline from White-
27 horse on, in the case of the Fairbanks corridor, would
28 require looping.

29 A That is correct.

30 Q And do you have any date

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1 on which that might occur?

2 A I do not.

3 Q Now, sir, at the bottom
4 of page 4 and the top of page 5 of your prepared evid-
5 ence, you say that:

6 "The Fairbanks corridor requires a new corridor
7 in Canada for the line from the Mackenzie Delta
8 area from Richards Island to just north of
9 Inuvik, south-westerly to near Fort McPherson,
10 then roughly parallel to the Dempster Highway
11 location from a point south-west of Dawson and
12 on to join the Alaska leg at Whitehorse."

13 Now, sir, having designed the capacity of your Fairbanks
14 alternate to carry 4½ billion cubic feet a day, and
15 being confident that there will be that much per day
16 from Prudhoe Bay, why do you need the Mackenzie Delta
17 supply line?

18 A As I said, sir, the
19 design of these facilities is on the same basis as the
20 design of the prime case, and it's only carried forward
21 to the 2¼ billion cubic foot a day level from each of
22 those sources. We have not gone beyond that.

23 Q But when you do get
24 beyond that, sir, you can operate your line at capacity
25 fully with Prudhoe Bay gas, can you not?

26 A If you were beyond --

27 Q Beyond 4½ -- beyond 2¼
28 billion cubic feet, through the Prudhoe Bay lateral.
29 As the Prudhoe Bay supply line builds up towards
30 capacity, you don't need the Mackenzie Delta gas in your

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1 system, do you?

2 A If there were -- I guess
3 what you're saying is that if there were 4½ billion
4 cubic feet a day available out of Prudhoe Bay, it would
5 fill a 48-inch pipeline.

6 Q Yes.

7 A That's correct.

8 Q And in that event you
9 wouldn't need -- for pipeline economics you wouldn't
10 need the lateral, or the supply line to the Mackenzie
11 Delta.

12 A You would not need it
13 in that instance where you had 4½ billion feet a day
14 available from Prudhoe, you would not need the Mackenzie
15 Valley gas to help fill up that line, no.

16 Q Now, sir, will you turn
17 to page 9 of your prepared evidence? In particular the
18 table showing comparison of numbers of compressor
19 stations, throughput, and pipeline mileages, the one
20 that you had on the chart on the screen, and I want you
21 to look at that table keeping in mind what the difference
22 might be if there were no Mackenzie Delta supply line,
23 and I suggest to you with respect to the compressor
24 stations that the total number of compressor stations
25 in the prime route as shown on that table is 34. Do
26 you agree?

27 A I don't quite understand.
28 Would you repeat that again, sir?

29 Q Well, you look on the
30 table and it says, "Stations, Prudhoe supply line to

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1 Mackenzie Delta, 0, mainline to Caroline, 31, stations
2 in the Yukon, 1," and that seems to add up to 34.

3 A No, sir, it adds up to
4 33. The stations in Yukon is just an indication of
5 how many stations there are that happen to be in the
6 Yukon, it does not get into the total. The number is 33.

7 Q I see. Then the next
8 column, "Interior route," the number is also 33.

9 A Yes sir.

10 Q And in the offshore corri-
11 dor it's 33.

12 A That's right.

13 Q And would it be the case
14 under the Fairbanks corridor that if you didn't have the
15 Mackenzie Valley supply line there would be only 29?

16 A I'm sorry, I have to back
17 up. What gas throughput are we talking about, sir?

18 Q Well, whatever you have
19 there, 4,500 million cubic feet a day mainline through-
20 put.

21 A If there was no Mackenzie
22 Delta line --

23 Q Yes.

24 A -- and the throughput was
25 4½ billion cubic feet a day, there would be more than
26 33 stations in the first four cases because in that
27 case the so-called -- I'm sorry, with respect to the
28 Fairbanks there would be more than.

29 Q How many would there be?
30

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 A I have those numbers here,
2 sir, but they would have to be, I think, taken off the
3 alignment sheets.

4 Q All right. Then let's
5 turn, Mr. Dau, to the mileages on that table. I'm first
6 interested in the category at the bottom of the page
7 headed:

8 "Total system mileage."

9 WITNESS DAU: Yes sir.

10 Q And as a matter of
11 definition, you look at the total system as being that
12 part in Alaska and that part in Canada.

13 A Yes sir.

14 Q And why not also that
15 part south of the 49th Parallel?

16 A The total system south
17 of the 49th, sir?

18 Q Yes.

19 A I guess just because we
20 considered it only to the 49th.

21 Q Well, if you were thinking
22 of your project as a system, as I understand it, it
23 can't go forward without new construction south of the
24 49th Parallel.

25 A That's my understanding,
26 sir.

27 Q And so if one were looking
28 at the whole system, you'd have to add to all of those
29 mileages some hundreds or thousands of miles south of
30 the 49th Parallel.

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 A I believe that's correct,
2 if you looked at the system that eventually delivered
3 to its final market place, yes.

4 Q Which is integral and
5 necessary to the success of your project.

6 A Oh yes.

7 Q Mr. Dau, if you took out
8 of the Fairbanks corridor again the Mackenzie supply
9 line so that the Fairbanks corridor carried only Prudhoe
10 Bay gas, and wanted to derive the length then, would
11 it be correct that from the Fairbanks corridor the total
12 system mileage of 3,549 you would subtract 737 miles,
13 which is the Ma ckenzie supply line?

14 A Yes, if the destinations
15 were the same.

16 Q And the result would be
17 2,812 miles.

18 A I accept your arithmetic,
19 sir.

20 Q And that, sir, is 183
21 miles longer than your prime route. Is that correct?

22 A I accept your arithmetic,
23 sir.

24 Q And if you add that mile-
25 age south of the 49th Parallel --

26 A Excuse me, sir, it's
27 183 miles longer than the prime route?

28 Q Yes.

29 A Total prime route?

30 Q Well, what your number

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 down there for the prime route -- well, I'll tell you
2 what I did, sir, I took 3,549 miles under the Fairbanks
3 corridor, I subtracted 737, which is the Mackenzie
4 supply line, and got 2,812, and from that I subtracted
5 2,629 for the prime route and the difference, as I saw
6 it, was 183 miles.

7 A The arithmetic is correct,
8 sir, but the 2,629 miles includes the lateral from
9 Prudhoe Bay and from the Mackenzie Delta.

10 Q So what you're saying is
11 that I should take some mileage out of there then, if
12 I'm going to take out the Mackenzie Valley supply line.

13 A Well, I'm not quite sure
14 where you're going with it, sir. If you're talking --

15 Q Well, what I'm suggesting
16 to you is that if you're a U.S. consumer in terms of
17 miles which affects cost of transportation, it really
18 doesn't matter to you whether your gas comes from
19 Prudhoe Bay wholly through the Fairbanks corridor or
20 through the prime route.

21 A If I was a U.S. consumer,
22 sir, I would be interested in the cost of service, I
23 would think.

24 Q Yes, well I think we'll
25 probably come to that, but at this stage as total
26 mileage has something to do with cost of service, that
27 would be a consideration to you, that it wasn't really
28 very much longer.

29 A I grant you, there's not
30 in the total mileage we're talking about, there's not

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 a significant difference in mileage.

2 Q Yes, for the distance
3 which the Prudhoe Bay gas will travel.

4 A Not a large difference
5 in mileage.

6 MR. GIBBS: Yes.

7 THE COMMISSIONER: Well, what
8 you're saying, as I understand it, Mr. Gibbs, is that
9 if you have 4½ billion cubic feet of gas a day available
10 at Prudhoe Bay, you can take it to the United States
11 by the Fairbanks route or the Mackenzie Valley route.
12 If you do that you say you should deduct 737 miles from
13 the Fairbanks route because that represents the mileage
14 involved in bringing the Canadian gas from delta to
15 the trunk line, and that's how you get 2,812. Mr.
16 Dau says to make those figures comparable you should
17 deduct the delta supply line from the Mackenzie Valley
18 route for taking Prudhoe Bay gas to the 49th Parallel.
19 Is that -- I'm saying this so that both of you will
20 appreciate what I think you're talking about.

21 MR. GIBBS: I don't think we
22 got that far. I was putting myself, sir, in the position
23 of a U.S. consumer saying, "By which route will my gas
24 from Alaska have to travel the furthest number of miles?"
25 I was persuading Mr. Dau, and I think I succeeded, in
26 agreeing that there was not a significant difference,
27 and if there were any difference it was about 183
28 miles.

29 WITNESS DAU: No sir, I
30 think it's more than that, isn't it?

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 THE COMMISSIONER: I think it's
2 the difference between 2,812 and 2,486,

3 A It's something over 300
4 miles, I believe, sir. 326 is the number, yes.
5 That is a fairly significant number.

6 MR. GIBBS: Why would it be
7 326?

8 A I understand, sir, that
9 you're talking about the mileage that the Prudhoe Bay
10 gas has to travel to get to its destination on the 49th
11 Parallel.

12 Q Yes.

13 A Now, if you're ~~only~~ talk-
14 ing about Prudhoe Bay gas on the prime route and you
15 ignore the Mackenzie Delta gas, I believe the mileage
16 from the delta down to the junction on the prime route
17 is something on the order of 127 miles.

18 THE COMMISSIONER: 143,
19 according to page 9, and if you deduct that you get
20 24, you said.

21 A 143 miles, so you should
22 deduct that. If you go to the Fairbanks corridor,
23 which is 3,549, you should deduct the 737. My experts
24 tell me that difference is 326 miles.

25 MR. GIBBS: All right, sir.

26 Q Then the U.S. consumer
27 says to himself in terms of mileage that it's 326 miles
28 longer by the Fairbanks corridor than it is by the prime
29 route.

30 A Yes.

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 Q And you have no number for
2 the total system mileage, including the mileage south
3 of the 49th Parallel?

4 A I do not.

5 Q So it therefore follows
6 that you can't tell me what percentage 326 miles repre-
7 sents of the whole system.

8 A No, I cannot.

9 Q Mr. Dau, will you turn
10 now to page 10 of your prepared evidence? I am inter-
11 ested again in the table on that page, and again in the
12 column, "Fairbanks corridor", if you leave out the
13 Mackenzie Valley supply line, Mackenzie Delta supply
14 line from the Fairbanks corridor, how many miles do
15 you have within continuous permafrost zone?

16 A I'm sorry, I don't know,
17 sir.

18 Q Does anyone on the panel
19 know?

20 A Just one moment. This
21 is pretty rough but it would be about 150 miles within
22 the continuous permafrost zone on the permafrost map
23 of Canada -- on the line from the delta.

24 Q So the corridor without
25 the delta line would be about 250.

26 A About 250, and that's
27 quite rough, sir.

28 Q And can you give me what
29 the mileage would be in the discontinuous permafrost
30 zone without the delta supply line in place of the

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 1800 that is now there?

2 A Something over 500,
3 550, perhaps, something on that order.

4 Q And then down into the
5 last sub-heading, without the Mackenzie Delta supply
6 line how many miles of continuous mountain -- or of
7 mountainous terrain would there be on the Fairbanks
8 corridor?

9 A Oh yes, 550 is subtracted
10 from the 1,800, sir, so it's 550 miles in the discon-
11 tinuous zone between the delta and Whitehorse; and I'm
12 sorry, I don't have a number for the 850.

13 Q You have no way of
14 estimating that number?

15 A I'm sorry, sir, I don't
16 have those maps here.

17 Q All right. Will you
18 now turn to page 13 of the prepared evidence? I'm
19 looking at the bottom of the page:

20 "The Fairbanks corridor has over 900 more
21 miles of pipeline, but does have a considerable
22 portion of it in mountainous terrain, which
23 allows a greater proportion of summer construc-
24 tion; but the very large extra distance never-
25 theless, and difficult mountain construction
26 makes the degree of confidence that it could
27 be constructed over the indicated period much
28 less than the prime route."

29 Mr. Dau, would that conclusion hold if you did not
30 -- if you left out the Mackenzie Delta supply line?

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 Would you then be confident that you could construct
2 the Fairbanks line in the indicated period?

3 A It would certainly help,
4 sir, if that line was never built from the Mackenzie
5 Delta.

6 Q It would be a substantial
7 --

8 A It would be easier to
9 construct, obviously.

10 Q Yes.

11 A I've not done such a
12 study to work out a plan to do it that way.

13 Q You can't help more than
14 say it would be better than building the delta supply
15 line.

16 A No, I didn't say that.

17 Q Well, you could keep your
18 timing better without the Mackenzie supply line.

19 A There are less miles of
20 pipe to construct under the circumstances you have
21 described, and therefore it would be easier to meet
22 the time schedule.

23 Q All right, sir. Will
24 you turn now to page 15 of your prepared evidence,
25 and there under the fifth sub-heading:

26 " Operations and maintenance considerations,"
27 the second sentence says:

28 "This increased effort is attributable to an
29 increase in length of the pipeline and to the
30 topography and consequent difficulties of access

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 in travel in the mountainous terrain traversed
2 by the interior route, Fairbanks and Fort Yukon
3 corridors."

4 The "increased effort" you refer to is a greater perfor-
5 mance effort for operation and maintenance. Now wouldn't
6 the difficulties of access and travel be substantially
7 removed if there were not as part of that project a
8 Mackenzie supply line? That is part of the Fairbanks
9 route.

10 A Yes, it would improve it.

11 Q Substantially, because
12 you've got highway all the way, haven't you?

13 A Not on the Fort Yukon
14 alternate.

15 Q No, but the Fairbanks
16 alternative.

17 A The Fairbanks, yes.

18 Q And you have commercial
19 airports at intervals.

20 A Yes.

21 Q And the difficulties
22 of access and travel would be probably less than even
23 on your prime route.

24 A Yes, I would think so
25 because of the highway.

26 THE COMMISSIONER:

27 Q Now, on the Fairbanks
28 route you have the highway, Prudhoe Bay south to Fair-
29 banks where you join the Alaska Highway, is that it?

30 A I assume that the Alyeska
Highway is available to us, yes sir.

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

MR. GIBBS:

Q Now, Mr. Dau, can we

come to the point which I know Mr. Marshall has been
eagerly awaiting, page 19 and the capital cost differ-
ences. First of all, Mr. Dau, thinking of the portion
of the project south of the 49th Parallel, would it be
correct to say that under either of those five alternate
routes or corridors the capital cost south of the 49th
Parallel will be the same?

A Yes.

Q And do you have any
figure for the capital cost south of the 49th Parallel?

A No, I do not.

Q Mr. Dau, can you break out
of those capital cost estimates the amounts which fall
within Canada? That is of your capital cost estimate
of \$5.7 billion on the prime route, how much of that
is within Canada?

A I'm pretty sure I do not
have that number here, sir.

Q And of the \$6.268 billion
on the interior route, how much of it is in Canada?

A I think I might have
that, sir. This is in the transcript of the proceed-
ings before the Federal Power Commission, if I could
give it to you in the order that it was given there
it would be a lot simpler, because it's in text rather
than in tables.

Q Yes sir.

A Fort Yukon corridor first,
The Alaskan lateral was estimated at \$1,459,000,000.

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 There are some additions because I can't read the next
2 number, and there's \$222 million in Canada of that
3 lateral, and that totals \$1,681,000,000.

4 Q I'm sorry, you lost me
5 there.

6 A I'm giving you the costs
7 on the Fort Yukon lateral, on the Fort Yukon case, and
8 I'm talking about the lateral from Prudhoe Bay to the
9 junction.

10 Q Well, I understood you
11 to say that the portion of the Fort Yukon corridor
12 within Alaska was 1.459 billion dollars.

13 A That's correct.

14 Q And it follows if you
15 subtract the rest of it has to be in Canada.

16 A I'm coming to that, O.K.,
17 that's all you need, yes sir, that's right.

18 Q And if you're ready to
19 subtract --

20 A No, I'm sorry, I was
21 giving you more detail on that. Again let me state
22 that these numbers don't track exactly with what's been
23 filed because of the difference in the engineering
24 format and the financial format.

25 Q Yes.

26 A But the difference would
27 be straight subtraction.

28 Q Yes, and the Fairbanks
29 corridor?

30 MR. MARSHALL: I'm afraid I'm

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 a little bit confused. Are we talking about when you
2 say "the lateral in Canada", are you talking about that
3 portion of the system that delivers only Canadian gas,
4 or are you talking about the part in Canada which would
5 carry both Canadian and U.S. gas?

6 MR. GIBBS: Well, sir, I didn't
7 use the word "lateral", I asked Mr. Dau how much of
8 his Fort Yukon corridor capital cost was within Canada,
9 without separating it into laterals or anything else,
10 the way you have it on the map, and I think that's the
11 answer he gave me.

12 A Yes, the difference I
13 believe is 5.2 billion.

14 Q 5.2 billion would be
15 within Canada?

16 A Yes sir.

17 Q And on the Fairbanks
18 corridor?

19 A The facilities in Alaska
20 are estimated at 2,238,000,000, that difference is about
21 5,890 -- 5,890,000,000.

22 Q Yes, and the offshore
23 corridor?

24 A That one I don't have,
25 sir, I'm sorry.

26 Q The interior route?

27 A I gave that information
28 previously at Yellowknife, but I don't recall the
29 numbers.

30 Q \$525 million, in Alaska.

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 No, there was a difference of 525 million.

2 A There was a difference,
3 I did give the numbers; I don't have them here, sir.

4 Q And the prime route?

5 A I thought they were given
6 in Yellowknife, too. Again I don't have them here.

7 Q Excuse me, sir. Mr.
8 Commissioner, I recall Mr. Dau telling me the difference
9 in cost in Alaska and Canada between the prime route
10 and the interior route; but I have no recollection of
11 it being severed into total cost within Alaska, not
12 just the difference, and if he can give us some number
13 at this time.

14 A I thought I gave the
15 answer in response to one of the Commissioner's ques-
16 tions.

17 THE COMMISSIONER: Yes, it
18 was, I remember the difference was something like
19 500 million, give or take a million.

20 MR. GIBBS: \$25 million is
21 petty cash, but the difference is 500 million but
22 that didn't cover the whole cost within Alaska, and
23 you're not able to give that at this time, Mr. Dau?

24 A I'm sorry, I don't have
25 it there, sir. I'm pretty sure it's in the record. I'll
26 attempt to find it tonight if we have a copy of
27 transcripts.

28 Q Well, we can do that if
29 there are copies of the transcripts here.

30 MR. MARSHALL: I have about

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty,
Cross-Exam by Gibbs

1 70 volumes of transcripts that you're free to peruse
2 tonight, Mr. Gibbs. I know we do have them, we
3 brought them.

4 MR. GIBBS: That's an offer
5 I can't refuse. What else would one do at night?

6 Q Mr. Dau, of the \$5.89
7 billion within Canada for the Fairbanks corridor, how
8 much is attributable to the Mackenzie Valley supply line?

9 A That's what I attempted
10 to give you originally, sir.

11 Q Be patient with me, I
12 guess.

13 A Your question again, sir,
14 please?

15 Q You gave me a figure of
16 the Fairbanks corridor of capital cost within Canada
17 of \$5.89 billion, and I ask you how much of that was
18 attributable to the Mackenzie Valley supply line --
19 Mackenzie Delta supply line?

20 A \$1,870,000,000.

21 Q So that, sir, insofar
22 as Canadian Arctic Gas Pipeline is concerned, and its
23 financing, under the Fairbanks corridor to carry
24 4½ billion cubic feet of gas per day from Prudhoe Bay
25 you would have to build a system in Canada of only
26 \$4 billion.

27 MR. MARSHALL: Well, Mr.
28 Commissioner, I don't think there's any such evidence
29 at all. There's certainly no evidence of a system
30 carrying 4½ billion cubic feet of gas a day from Prudhoe

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 Bay unless Mr. Gibbs wants to give such evidence.

2 THE COMMISSIONER: Well, there
3 may not be such evidence. Mr. Gibbs is seeking to
4 elicit it, if he can. I think that you should continue
5 if you have any further to go along this line.

6 MR. GIBBS: I'm going to get
7 further into the cost and the volume, but it did seem
8 to me pertinent because this system is going to serve
9 both U.S. and Canadian consumers, to know what it would
10 cost to carry gas at full capacity, only Alaska gas,
11 what the Canadian portion, what the financing would be
12 and I take it it follows, Mr. Dau, there would be about
13 \$4 billion.

14 A Absolutely not.

15 Q Well, sir, if you take the
16 Fairbanks corridor, which you told me \$5.89 billion
17 would be within Canada, is that correct?

18 A On the system that has
19 been designed and costed in these tables, the arithmetic
20 is correct, except that it will not carry 4½ billion
21 cubic feet of gas a day from Prudhoe.

22 Q You have to add some
23 compressor stations.

24 A Some substantial amounts
25 of compressor stations, sir.

26 Q Within Canada.

27 A And in Alaska.

28 Q Yes sir, but within
29 Canada how much compression do you have to add?
30

Day, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 A On which lateral, sir?

2 Q Well, sir, let's come
3 back again to the Fairbanks corridor, and without the
4 Mackenzie Delta lateral, and taking your 5.89 billion
5 dollars capital cost within Canada, and subtracting
6 the Mackenzie Delta lateral at 1.87, which gives you
7 about \$4 billion, and then tell me how much more
8 investment you would have to make in Canada to carry
9 your 4½ billion cubic feet a day from Prudhoe Bay,
10

11 A One moment, please, I'll
12 try to get an estimate.

13 MR. MARSHALL: Mr. Commissioner,
14 you can see the difficulties that the witness is being
15 put to trying to scale this off a map. I really wonder
16 if this is of much relevance at all? We're dealing
17 with various alternatives that have been considered,
18 and apparently Mr. Gibbs wants to consider another
19 alternative that hasn't been considered that involves
20 a lot of computation and calculations and so on, and
21 can we really get anywhere?

22 THE COMMISSIONER: Well, it's
23 obvious, at least it may not be obvious but it seems
24 to me that Mr. Gibbs is seeking to establish that
25 you could bring that Prudhoe Bay gas south to the
26 United States and I have the feeling that he will
27 suggest you can take that Mackenzie Delta gas south
28 through another system, which might indeed turn out to
29 be the proposed Foothills Pipeline, and --

30 MR. MARSHALL: Is that who
he's with?

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 (LAUGHTER)

2 I thought he was with the Indian Brotherhood.

3 THE COMMISSIONER: -- that's
4 a matter that I certainly think Mr. Gibbs ought to
5 pursue, and if it means that Mr. Dau has to resort to
6 his pocket calculator and Mr. Williams to put a rule
7 on the map, that suits me better than bringing a compu-
8 ter in here. This, after all, may demonstrate that
9 the proposal Mr. Gibbs wants to put before us is
10 altogether impractical. Why don't we wait and see?

11 MR. GIBBS: You may have to
12 wait quite a while.

13 A The mileage is approxi-
14 mately 250, Mr. Gibbs, and that would mean that there
15 would be an additional three or four compressor
16 stations. It would depend on the exact configuration.

17 Q At what cost?

18 A Oh, ball park, \$100
19 million.

20 Q 100 million, so that
21 instead of the \$4 billion, I suggest we might be
22 talking of 4.1 or 4.2 billion, under those circumstances.

23 A That's just a guesstimate,
24 sir, I haven't worked it out.

25 Q No, but those are based
26 on your figures.

27 A Yes.

28 Q Do those capital cost
29 estimates, sir, on page 19, include indirect costs and
30 interest during construction?

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 A Yes, they do. They
2 include indirect costs and indirect -- or interest during
3 construction, based on what I've defined as an engineer-
4 ing format that was in use at the time those estimates
5 were prepared, not precisely the way they are calculated
6 now. They're based on 1973 cost estimates.

7 Q Now, sir, in your filing,
8 Sections 10 and 11, the dollar figures in there are
9 1974 dollars.

10 A Yes sir.

11 Q And you brought them back
12 to '73 for purposes of the comparison on page 19.

13 A I brought them back?

14 Q Converted them to '73
15 dollars for your comparison on page 19.

16 A No sir.

17 Q Well, isn' t your
18 comparison on page 19, in 1973 dollars?

19 A The estimate was done in
20 1973 for all those cases, sir.

21 Q Yes, and the difference
22 between the prime route cost on page 19 and the prime
23 route cost in Sections 10 and 11 is the escalation
24 factor, because one is '73 and one is '74 dollars.

25 A And a better estimate,
26 sir, with more knowledge.

27 Q Yes, and I'm told that
28 that difference is about 6%. Can you confirm that or
29 not?

30 A No, I think it's

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 substantially more than that, sir. The problem I have
2 is that I don't have the corresponding costs in Alaska
3 to go with the 10.

4 Q The costing and the
5 facilities in Sections 10 and 11 are all Canadian costs.

6 A That's correct, sir.

7 Q So then, Mr. Dau, under
8 Sections 10 and 11 -- I don't have the exhibit number
9 for it -- you have under "detailed schedules" tab,
10 cost figures for each segment.

11 A Yes.

12 Q And in order to make the
13 comparison which you suggest in the prepared evidence
14 you presented, between the alternate corridors and the
15 prime route, one should have a similar breakdown of
16 costs by segments, should one not?

17 A To make what? I don't
18 quite understand, sir. We do not have it broken down
19 in that manner. We have it as the supply laterals,
20 if you like, the Prudhoe lateral to some junction or
21 the Delta lateral to some junction, and then the total
22 mainline.

23 Q I see, but you don't have
24 it broken down in the same segmented detail as you do
25 under Sections 10 and 11?

26 A No sir, the estimate is
27 not done in the same amount of detail at all.

28 Q Well, in order to take
29 that segmented detail, if you have in Sections 10 and
30 11, and bring it up to a similar comparable point, don't

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 we have to add to those figures, the segmented detail
2 costs of interest during construction and operating
3 costs?

4 A If you're talking about
5 the direct costs, yes.

6 Q Yes, in order to get
7 comparable figures to what you have on page 19.

8 A Yes.

9 Q And do you have those
10 indirect costs and allowance for funds during construc-
11 tion by segments in the segments you've set out in
12 Sections 10 and 11?

13 A No sir, we have not
14 prepared the cost estimates in that manner.

15 Q Well, again, sir, it
16 becomes very difficult to try and work out unit cost
17 figures when you don't have the same things to compare.
18 For example, you've given me the Prudhoe Bay supply
19 line on the Fairbanks corridor at \$1.8 billion. But
20 that includes indirect costs and interest during
21 construction. Is that correct?

22 A Yes sir, based on the
23 1973 cost estimate.

24 Q But you don't have the
25 same -- you don't have a figure for indirect costs
26 and costs during construction for the Prudhoe Bay
27 supply line under the prime route.

28 A I don't have it here, sir,
29 I'm attempting to get it.

30 MR. GIBBS: Mr. Commissioner,

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 the problem is that under the cost of facilities,
2 Sections 10 and 11, the segmented costs are given as
3 direct costs only. They do not have these indirect
4 costs and interest during construction costs which
5 amount to something in excess of oh, about \$1½ billion,
6 I'm told. Now, if one is going to go through the
7 exercise which I went through with Mr. Horte, of trying
8 to get a fair method of allocation of the cost, the
9 unit cost of transporting gas, you have to have these
10 figures for segments which carry only Canadian gas
11 and segments which carry only U.S. gas, and it's only
12 then, in my submission, that you can get down to the
13 49th Parallel and say on a comparable basis that the
14 unit cost is more in one route or the other; and so
15 in my submission Arctic Gas ought to be asked to pro-
16 duce the same breakdown by segments of interest during
17 construction and indirect costs as they have of direct
18 costs. They must have it, they have to have it for
19 the cost of service calculations.

20 THE COMMISSIONER: Well, Mr.
21 Marshall, what do you say?

22 MR. MARSHALL: I don't know
23 whether that information is available in that form.
24 If I understand Mr. Gibbs, it depends on the manner
25 in which the tariff is calculated as to whether or not
26 you require that information in that form or you don't.
27 I'll have to check with the Arctic Gas people involved
28 in this area and I'll try to let Mr. Gibbs know this
29 evening, if I can.

30 THE COMMISSIONER: Well, we've

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Cross-Exam by Gibbs

1 been going for a while. I think we will adjourn for
2 coffee, and Mr. Scott, if you can assist Mr. Gibbs and
3 Mr. Marshall in sorting this out during the coffee
4 break, please feel free.

5 (PROCEEDINGS ADJOURNED AT 3:40 P.M.)

6 (PROCEEDINGS RESUMED AT 4:10 P.M.)

7 MR. MARSHALL: Mr. Commissioner,
8 I have a little bit of information with respect -- con-
9 cerning the point that my learned friend was raising.
10 As I understand it, what he is looking for is a break-
11 down of the indirect expenses that would be incurred
12 with respect to each segment of the line. The
13 capital cost exhibit, which is Section 10 in the
14 materials filed with the N.E.B., breaks down the direct
15 expenses on a segment by segment basis, and he wanted
16 to know what the indirect costs were, and as I under-
17 stand it, it's not simply a matter that you can
18 proportion, depending on the length of the line because
19 indirect costs, to take an example, the interest during
20 construction would be a function of when that segment
21 of line was being built and when the funds were drawn
22 down and so on; and accordingly it's a very complex
23 question. The information may be in a computer program.
24 It's not necessary for the Arctic Gas application in
25 the way it has been presented to have broken down the
26 information that way, and as I understand it, it hasn't
27 been done. It may be possible to break it down in
28 this other way, but at this point I don't know. Mr.
29 Trusty or some of the others on the panel would have
30 to do some checking to see just what information is

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1 stored.

2 MR. GIBBS: Well, sir, on
3 page 17 of the direct evidence under the sub-heading,
4 "Cost considerations"
5 the first sentence says:

6 "In order to allow a comparison of projected
7 costs of the proposed pipeline on the prime
8 route with costs associated with alternative
9 routes,"

10 now, sir, I don't know how one can do it unless one
11 has similar cost figures, and as on page 19 there are
12 total capital cost estimates and as in Sections 10 and
13 11 on the segments they are not total capital cost,
14 it seems to me we have to have those on a segment
15 basis to make these sensible comparisons.

16 MR. MARSHALL: Perhaps it
17 might help if we could check first to see if this
18 information is readily at hand. I'll talk with Mr.
19 Gibbs further at the close of the day to make sure
20 that I understand what it is he's enquiring about.
21 I think I've got it right, but I just want to make
22 sure. I think then perhaps Mr. Trusty might be able
23 to check and we could let you know soon whether or not
24 the information is available.

25 I might say I don't know whe-
26 ther it's the type of information that's of general
27 interest in the Inquiry. Mr. Gibbs may well have an
28 interest in it, but as to whether or not you wish to
29 go into that in detail here, sir, perhaps we could
30 leave till later.

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Hemstock, Banfield, Trusty
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1
2 THE COMMISSIONER: Well, we'll
3 leave it at that for now then.

4 MR. GIBBS: I take it then
5 Mr. Marshall and I will talk about it this evening and
6 come back and speak to you tomorrow morning.

7 THE COMMISSIONER: Certainly.

8 MR. GIBBS: Q Mr. Dau, would
9 you arm yourself again with the volume, Sections 10
10 and 11?

11 A Yes sir.

12 Q And would you look at
13 the first page under tab 1, "Base case escalated cost"?

14 A Yes sir.

15 Q And there you'll see
16 the total construction cost, figure that the Commissioner
17 asked for this morning, 7.014 billion dollars.

18 A Yes sir.

19 Q And you explained that
20 that applied only to the Canadian facilities.

21 A Yes sir.

22 Q And if we add to it the
23 1974 costs of the Alaskan facilities, what does the
24 total become?

25 A That's the number I don't
26 have, sir, I'm trying to get, is the escalated 1974
27 cost estimate for the facilities in Alaska.

28 Q All right, sir, then on
29 pages 4236 and 4237 -- and I don't have them here, I
30 just made notes of them -- there was a discussion
between yourself and the Commissioner, and line 19 of

Dau, O'Rourke, Williams, Clark,
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1 4236 the Commissioner said:

2 "In the application filed in March of 1974,
3 you were to begin laying pipe in the winter
4 of 1976."

5 And your answer was, "Yes."

6 Then on line 26 of the same
7 page, the Commissioner said:

8 "Mr. Horte sent a letter to the Minister,
9 which the Minister sent along to me a few
10 months ago, that said that those dates were
11 to be set back a year, and that would mean
12 that the pipe would commence to be laid in
13 the winter of '77, and your presentation here
14 proceeds on that assumption, except that in
15 the last paragraph you read, you are suggesting
16 the laying of the pipe really would not commence
17 until the winter of '78."

18 Your answer was, "That is correct, sir."

19 Now, that two-year delay, Mr.
20 Dau, how much do we escalate that 7.014 billion dollars?

21 A I don't know, sir.

22 Q You have not used
23 escalation figures that will convert that into actual
24 costs rather than this year's dollars or last year's
25 dollars?

26 A This cost estimate was
27 based on prices that were obtained in 1974. We are
28 currently getting^a better fix on those prices. If in
29 fact the escalation rates that were assumed in the
30 cost estimates were exactly correct, there would be

Dau, O'Rourke, Williams, Clark,
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1 a escalation equivalent to the rates that were
2 used in the last two years of our escalated program.
3 I do not have that number. Obviously prices have
4 changed since that time and that's why we're re-doing
5 the cost estimates.

6 Q And when do you expect
7 to have that cost estimate done?

8 A I think it's a matter of
9 a month or two, sir.

10 Q I take it that your
11 counsel is going to produce that in due course also?

12 MR. MARSHALL: I haven't said
13 anything.

14 MR. GIBBS: I was inviting you
15 to say something.

16 MR. MARSHALL: I expect when
17 the capital cost estimates have been re-calculated, if
18 there is a new figure we can make them available to
19 you, Mr. Gibbs.

20 A I'm not sure of that
21 exact time frame, Mr. Gibbs. I think it's in the order
22 of one or two months but I'm not positive.

23 MR. GIBBS: Q Mr. Dau, would
24 you now take the volume, "Alternate Corridors & System
25 Transportation", and look under the tab, "Fairbanks
26 corri_dor", tab 1.4, and find table 5-1, which is
27 on page 7 under that tab?

28 A Yes sir.

29 Q And look under the year
30 1982 at annual operating cost, and you have a difference

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Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 in the annual operating cost between the Fairbanks
2 corridor and the prime route of 50 million 200 thousand
3 dollars per year.

4 A Yes sir.

5 Q Can you explain to what
6 that difference is attributable?

7 A It reflects the additional
8 manpower, equipment, district headquarters, repair
9 and replacement of parts that would be required, mainly
10 resulting from the greater pipeline mileage.

11 Q And then, sir, can you
12 tell me what the difference would be if you didn't
13 have the Mackenzie Delta supply line?

14 A No, I cannot.

15 Q And can that be worked out?

16 A An operating cost for
17 a system on that route without the Mackenzie Delta
18 supply line, yes, it could be worked out.

19 MR. MARSHALL: Mr. Gibbs, can
20 you tell us what kind of a system you're looking at
21 so that I understand? Are we talking about a 4.5 billion
22 cubic feet, or 2.25 billion cubic feet system?

23 MR. GIBBS: No, we're talking
24 about a system from Prudhoe Bay to the 49th Parallel,
25 carrying 4½ billion cubic feet a day, without the
26 Mackenzie Delta supply line.

27 A We've not designed that
28 system as such. We have designed a system which the
29 pipe size is based upon 48-inch, obviously 48-inch,
30 with an ultimate capacity of 4½ billion cubic feet a

Dau, O'Rourke, Williams, Clark,
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Cross-Exam by Gibbs

1 day with some certain compressor station locations.
2 We have prepared cost estimates that reflect the
3 throughput through the system from Prudhoe Bay to the
4 junction on the basis of 2½ billion cubic feet a day,
5 the junction on the Fairbanks ^{of} course being at Whitehorse,
6 and with throughputs from Whitehorse to Caroline at the
7 rate of 4½ billion cubic feet a day, and then equally
8 split through the delivery laterals. Costs are based
9 on that system. It includes, obviously the costs include
10 the supply lateral from the Mackenzie Delta. Now we
11 have not looked at a system that excludes the Mackenzie
12 Delta.

13 Q Well, Mr. Dau, you looked
14 at a system which has a 48-inch supply line from each
15 source of supply.

16 A Yes.

17 Q That's right, and you've
18 looked at a system that has a 48-inch line from White-
19 horse on down to Caroline.

20 A Yes sir.

21 Q And you've looked at the
22 additional compression necessary to bring the 48-inch
23 line from Prudhoe Bay up to full capacity of 4½ billion
24 cubic feet a day.

25 A Only to the extent to
26 determine the number of stations.

27 Q Surely the next step is
28 to determine what the operating costs are going to be
29 when you add those stations, and you haven't done that?

30 A No sir.

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 Q Mr. Dau, do you have any
2 contingency plan in the event that delta gas is not
3 available?

4 A No sir.

5 Q Well, sir, what's going
6 to happen to your project if, for example, Mr. Getty's
7 proposed gas flop goes through and the Canadian Govern-
8 me_nt decides we don't need the delta gas in a hurry,
9 then what are you going to do with your system, run
10 all Prudhoe Bay gas through it?

11 MR. MARSHALL: Surely, Mr. Gibbs,
12 it's ^{not} 'N.E.S.' s system and you probably are asking the
13 wrong witness.

14 MR.GIBBS: Mr. Commissioner,
15 these people don't live in isolation, in ^a vacuum, and
16 they must have drawn some contingency plans. They
17 know the question mark hanging over the native land
18 claims, over whether there will be curtailments in
19 Canadian supply, or what will happen. It defies under-
20 standing that they would design a system which, if one
21 lateral fails, have no contingency to it.

22 MR. MARSHALL: Surely the
23 witness to ask about this is not, sir, the company.
24 Mr. Dau is a consultant who I am sure would be happy
25 to study everything under the sun. That doesn't get
26 us anywhere. We're talking about an application to
27 build a specific type of facility. Now, Mr. Gibbs is
28 postulating circumstances in which the application, as
29 filed, would not be granted. That type of a system
30 would simply not be built. He's into that ground. The

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1
2 person to ask as to whether or not Canadian Arctic
3 Gas would be interested in some other type of proposal
4 completely different from the system that they are
5 proposing in this proceeding is an officer of the
6 company, not a consultant.

7 THE COMMISSIONER: Well, at
8 any rate, Mr. Dau, you aren't aware of any contingency
9 plan such as Mr. Gibbs has suggested you ought to be
10 aware of. Is that where we're at?

11 A I'm not aware of such a
12 plan, sir.

13 MR. GIBBS: Q Your design and
14 cost estimates include with respect to the prime route
15 the cost of supplying Alaska gas to Alaska communities
16 such as Fairbanks?

17 A No, they do not.

18 Q Have you made any study
19 whatsoever to supply Alaskan communities as part of
20 your project costs?

21 A We've made such a study
22 I believe two or three years ago. I'm hazy on the date,
23 sir, of a smaller line that followed the Alyeska Pipeline
24 route as far as Fairbanks, and supplied fuel to the
25 pumping stations on the Alyeska Pipeline.

26 Q And are you able to pro-
27 duce your capital cost estimate for that?

28 A I have none of that
29 information here, sir.

30 Q All right, can you tell

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 me what sized line you had in mind?

2 A I think it was 16-inch
3 on the north end, sir. It reduced in size as it got
4 towards Fairbanks, I've forgotten the final size.

5 Q Would you go back now
6 to page 19 of your prepared evidence, and after the
7 table on page 19 you talk about the difference in
8 costs, and say that it's a matter of substantial
9 concern, and then say:

10 "First, once the line is built and operating,
11 the greater capital and operating costs of the
12 alternatives would translate directly into
13 increased transportation costs from the rates
14 to the consumers."

15 What consumers are you referring to there, sir?
16 U.S. or Canadian?

17 A Both, sir.

18 Q And that conclusion is
19 based upon your Mcf. ^{mile} method of calculating tariffs.

20 A I don't know whether it
21 is or not. It would seem apparent to me, sir, that
22 the substantial increases that are reflected in either
23 the Fairbanks corridor or the Fort Yukon corridor
24 would reflect increased costs to both American and
25 Canadian consumers. The gas is hauled, each Mcf. is
26 hauled more miles and the system costs more in capital
27 expenditures.

28 Q And you can't go any
29 further than saying that it seems obvious, you have no
30 --

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1
2 A I have not done the
3 calculations.

4 Q -- not done any calcula-
5 tions, all right sir, then the second reason you give
6 is this:

7 "The magnitude of the capital costs of at least
8 the Fort Yukon and Fairbanks corridors raises
9 a serious question as to whether pipelines
10 along those routes could be financed."

11 In making that statement, sir, are you speaking on
12 behalf of Canadian Arctic Gas Pipeline alone, or
13 Canadian Arctic Gas Pipeline and Alaskan Arctic Gas
14 Pipeline?

15 A I believe that statement
16 reflects both Alaskan Arctic and Canadian Arctic.

17 Q And, sir, if you sever
18 off Alaskan Arctic and speak only of Canadian Arctic
19 Gas Pipeline, would you still say that the difference
20 raises a serious question as to whether the pipeline
21 could be financed?

22 MR. MARSHALL: I don't think
23 I understand you, Mr. Gibbs. Where would the gas
24 come from if there was no --

25 MR. GIBBS: Well, never mind,
26 Mr. Marshall.

27 MR. MARSHALL: What are we
28 talking about?

29 MR. GIBBS: These witnesses
30 are sitting here as Canadian Arctic Gas Pipeline, and
Mr. Dau has just finished going through tables here on

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1 page 9 telling me that the Canadian portion of the
2 Fairbanks corridor is 5.89 billion dollars, and the
3 Canadian portion of the Fort Yukon corridor is 5.2
4 billion dollars, and the prime route is 5.7 billion,
5 and you can't give me the Canadian portion. If you
6 can finance something over 5 billion on the prime
7 route, I want to know why you say that you can't
8 finance something over 5 billion on the Fairbanks
9 corridor, if he's talking Canadian Arctic Gas.

10 A Well, first, sir, these
11 numbers are based on 2½ billion cubic feet a day coming
12 from the delta; if there's no Alaskan Gas --

13 Q Oh, you don't understand
14 me to suggest there's no Alaskan gas. What I'm saying
15 to you is the Alaskan Arctic Gas financing problems
16 are one thing and yours are another, and I'm asking
17 you whether it's your evidence that Canadian Arctic
18 Gas Pipeline would have serious financing problems on
19 its share of the Fairbanks corridor.

20 A I'm sorry, I can't
21 respond. My understanding is that statement is with
22 respect to the combined system. It refers to a
23 system and it says that in the Fairbanks corridor
24 there is \$2 billion plus additional capital required
25 to achieve the same throughputs in the fifth operating
26 year.

27 Q But you cannot tell me
28 whether these financing problems exist for Canadian
29 Arctic Gas Pipelines on the Canadian portions.
30

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs

1
2 A I don't know, I'm not
3 the witness to talk to that, sir.

4 THE COMMISSIONER: Mr. Trusty,
5 you wanted to get into this, I take it.

6 WITNESS TRUSTY: I simply
7 wanted to note to Mr. Gibbs that we are talking about
8 a project financing here with both companies leaning
9 on essentially the same capital markets, and it's taken
10 as a project whole, and investors don't say, "Well,
11 you've hived off a portion and now the numbers show
12 gas in a vacuum," they look at a total system.

13 MR. GIBBS: Q Mr. Trusty,
14 that's what bothers me about south of the 49th Parallel.
15 Shouldn't you be, if you're talking about the total
16 system, bringing those capital costs in here too? And
17 if you're raising the spectre of financing problems
18 because of high costs, shouldn't this hearing be
19 thinking about the costs of the northern border pipeline
20 construction south of the 49th Parallel? Isn't that
21 all one system?

22 A With respect, Mr. Gibbs,
23 you're confusing separations that have been made for
24 application purposes given the regulatory authority to
25 whom the applications are directed, and questions of
26 overall system financing. Furthermore, there are other
27 companies involved south of the 49th Parallel who belong
28 to a separate consortium known as the Northern Border
29 Group, who have their own financing plan. Those finan-
30 cing plans obviously mesh with the Arctic Gas financing
plan, and from a total project north and south of the

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Cross-Exam by Gibbs

1 49th Parallel there's confidence that the capital
2 markets will support both.

3 Q But you have just said
4 here that you start now to doubt whether the capital
5 markets can support the Fairbanks corridor.

6 A No sir, I didn't say that.

7 Q Well, sir, on page 19:
8 "The magnitude of the capital cost of at least
9 the Fort Yukon and Fairbanks corridor raises a
10 serious question as to whether pipelines along
11 those routes could be financed."

12 A Yes, that's correct.
13 I'm sorry, I thought you were referring to my comment
14 about the \$4 billion number that you raised.

15 Q No. All I'm trying to
16 get you to tell me is whether your concern is on behalf
17 of Alaskan Arctic Gas or Canadian Arctic Gas.

18 A The concern as expressed
19 here, sir, is both Alaskan and Canadian Arctic Gas.

20 Q Well, it is really Alaskan
21 Arctic Gas because the increased cost falls upon Alaskan
22 Arctic Gas, does it not?

23 A It's the same capital
24 markets, though, so it's the same --

25 Q I know it's the same
26 capital markets; it's the same capital markets for the
27 northern border group as well; but thinking of the
28 Fairbanks corridor, won't you just take this short
29 step with me and agree that the increased costs are
30 Alaskan Arctic Gas costs, not Canadian Arctic Gas pipeline.

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Gibbs
Cross-Exam by Anthony
A As they were calculated

here a minute ago, yes, I'll agree with that.

MR. GIBBS: Thank you. Mr.
Commissioner, I'll speak with Mr. Marshall tonight and
I may have some further conversation on capital costs
arising out of that, and perhaps not. Thank you.

THE COMMISSIONER: Thank you,
Mr. Gibbs. It's so long since we last had a formal
hearing I can't remember who is supposed to go next.
Oh, well we'll stop for five minutes for coffee.

(PROCEEDINGS ADJOURNED AT 4:35 P.M.)

(PROCEEDINGS RESUMED AT 4:45 P.M.)

THE COMMISSIONER: Let us
return to our seats, ladies and gentlemen, and we can
make use of the next few minutes.

MR. GOUDGE: Mr. Anthony is
next on the cross-examination.

MR. ANTHONY: Mr. Commissioner,
I'd like to perhaps start this afternoon by some general
questions about routing and route selection.

CROSS-EXAMINATION BY MR. ANTHONY:

Q I refer you, Mr. Hemstock,
to the first page of the evidence as presented this
morning, and the second paragraph, where you took time
right at the outset to make clear that when you talked
about routing and in particular you talked about corridor
routes, you were not referring to corridor as defined
and as used in the pipeline guidelines. I take it

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Cross-Exam by Anthony

1 that what you are excluding there is the concept of
2 corridor as a planning mechanism and the concept of the
3 acceptability of routes as they relate to other trans-
4 portation systems -- highways, oil pipelines, and so on.
5 I wonder if perhaps you could start by explaining to me
6 why this exclusion and whether or not in fact the
7 questions of route selection dealt with "corridor" in
8 that sense?

9 WITNESS HEMSTOCK: What we
10 wanted to make clear here is that we were comparing
11 pipeline corridors and we were simply not using the
12 term as used in the pipeline guidelines, which relates
13 to a transportation corridor which may have or may
14 consider other modes of transportation within that
15 relatively broad band. We were doing that in order
16 to clarify the direct comparison between one segment
17 of pipeline and another segment of pipeline. The idea
18 of a transportation corridor with other modes of
19 transportation is quite different, and it would be
20 another factor which you might consider in your compari-
21 son of, if you like, pipeline corridors.

22 Q Now, did you in your
23 research and in your evaluation of alternate routes
24 consider this factor?

25 A It was not a major factor
26 in our consideration, but it was noted in the prelimin-
27 ary -- in some of the preliminary reports, at least,
28 that those segments which, for instance, followed the
29 Alaskan Highway would be somewhat different in their
30

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Cross-Exam by Anthony

1 impact to wildlife because of the location of the high-
2 way in that -- and again "transportation corridor".
3 What is not necessarily obvious is that in certain cases
4 it may well be that the impact of another transportation
5 mode in a corridor is an additional impact, or an
6 incremental one which in certain circumstances may have
7 detrimental effects.

8 Q Do I understand it then
9 that the evaluation of impact to wildlife and evaluation
10 of impact on terrain and so on that you've described
11 throughout your evidence relates solely to the impact
12 of a gas pipeline?

13 A In this context, yes, it
14 relates to a gas pipeline.

15 Q You stated that on the
16 basis of some report that you had that there may be a
17 different impact on those segments as would correspond
18 with a highway. How would they be different?

19 A The consultants in several
20 cases have noted that the location, for instance, of a
21 highway parallel to some of these segments would provide
22 a certain amount of disturbance in that area and that
23 the pipeline would be an incremental disturbance to that
24 -- added disturbance to that. They point out, too,
25 that this would vary from species to species in specific
26 cases.

27 Q Your consideration of the
28 impact, then, as it relates to the question of alternate
29 transportation systems suggests that a pipeline would
30 result in incremental impact; is that the information

Dau, O'Rourke, Williams, Clark
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Cross-Exam by Anthony

1 that you have that you relied on?

2 A When you are preparing or
3 when you are talking about a pipeline in a transportation
4 corridor, is that the question?

5 Q Yes.

6 A Yes, it would result in an
7 incremental impact.

8 Q And the evidence that you
9 have upon which you based your analysis would be that
10 a gas pipeline going along, for example, an existing
11 highway would result in an incremental environmental
12 impact.

13 A Yes.

14 Q And would I be right in
15 suggesting then that in an untouched area that there
16 would similarly be an incremental impact if there was
17 gas pipeline, an oil pipeline, and a highway or such
18 a combination of those?

19 A Well, if it's an untouched
20 area, you start off with one transportation mode, what-
21 ever it might be. The other additive transportation
22 modes would be an incremental impact to the first one
23 that was laid down.

24 Q And each case has a
25 cumulative effect as you have various transportation
26 modes.

27 A I would think not necessar-
28 ily, or the cumulative impact might be very small. I
29 might refer this to Dr. Banfield, who has been -- or
30 who has done some study on the incremental impact of

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Hemstock, Banfield, Trusty
Cross-Exam by Anthony

1 various modes, and who could perhaps point out the fact
2 that in many cases different transportation modes may
3 have different and new impacts which were not there
4 with the first one. Dr. Banfield?

5 Q Sorry, we were trying to
6 direct our issue towards this question of cumulative
7 effect as it relates in corridors, and with that
8 introduction perhaps you could tell me what your
9 studies were and what they indicated?

10 WITNESS BANFIELD: Yes, I have
11 used a slightly different phrase, the common utility
12 corridor concept, and I believe that many environmen-
13 talists have too readily accepted the notion that the
14 incremental impact of a second utility line is only a
15 fractional addition to the primary impact of the first
16 utility constructed in the corridor. This concept
17 has never really been critically analyzed and there is
18 no data to suggest or to substantiate such a conclusion.
19 In fact, that point has recently been made in the U.S.
20 Department of Interior's environmental impact statement.

21 THE COMMISSIONER: On this
22 project?

23 A Yes sir. In view of a
24 complex inter-action of environmental factors there
25 are logical reasons to believe that the cumulative
26 impact may be synergistic and multiplicative rather
27 than simply additive in total.

28 THE COMMISSIONER: I wonder if
29 we could translate that?

30 (LAUGHTER)

Dau, O'Rourke, Williams, Clark,
Hemstock, Banfield, Trusty
Cross-Exam by Anthony

1
2 Would you explain those terms, please, sir?

3 A A number of factors inter-
4 acting interact in two ways: One is antagonistically
5 in which one cancels the action of another, and syner-
6 gistically in which one factor enhances the total appli-
7 cation of the inter-action, and when such an action takes
8 place this is the alternative to antagonistic, and
9 it's called "synergistic".

10 Q The whole is greater than
11 some of its parts?

12 A Exactly. I can explain
13 it perhaps if we consider such a corridor that comes
14 up to mind, and that is the proposed common utility
15 corridor from Prudhoe Bay southward to Fairbanks
16 presently, in which presently the Alyeska Oil Pipeline
17 is being constructed. In order to preserve the integ-
18 rity of the oil pipeline, and as a safety precaution,
19 the gas pipeline would have to be constructed in its
20 own right-of-way some distance away, anywhere from six
21 miles to perhaps 200 yards distance. The time of
22 construction would be different, and the mode of con-
23 struction would be different, and obviously one is
24 primarily a buried pipeline and the other is a mix of
25 elevated with buried sections. The gas pipeline
26 requires compressor stations that are different in
27 nature to the oil-pumping stations of the oil pipeline,
28 different in the nature of impact that they present.
29 The gas pipeline requires its own communications
30 system, maintenance staff, and maintenance regime.

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1 These are also quite different from an oil line, maintain-
2 ing an oil line. It would seem that the total impact
3 of the two pipelines would be double, rather than the
4 second pipeline introducing a small additive incremental
5 impact. With the granting of a permit for the oil
6 pipeline, we can assume that the authorities concluded
7 that the expected environmental impacts ~~were~~ acceptable,
8 or that they would be within the tolerance levels of
9 the terrain, rivers, fish, vegetation, and animal
10 communities to withstand the expected disturbances
11 of gravel withdrawals, construction noise, air pollu-
12 tion, terrain disturbance; but there is no evidence
13 available to conclude that the biotic communities in
14 the narrow valley of the Brooks Range can tolerate
15 the cumulative disturbances of a second pipeline that
16 has additional demands for terrain, gravel, as well
17 as different disturbances due to compressor station
18 noises, for instance. It is entirely possible that
19 the cumulative impact, will exceed the tolerance of
20 adaptability of a fish, raptors, large mammals, and
21 certain plant communities to remain living in the
22 corridor under this combined corridor, the combined
23 disturbance of the two pipelines. I believe that this
24 problem needs investigation, special investigation
25 before the advantages of a common utility or common
26 transportation corridor concept are accepted without
27 critical analysis.

28 Q Excuse me. Are you saying
29 that if the Prudhoe Bay gas, if it were proposed, as
30 Mr. Gibbs appears to be doing, that the Prudhoe Bay

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1 gas should be brought down the Alaska utility corridor,
2 that is along the route of the Alyeska Pipeline to
3 Fairbanks, that it might well be that the environmental
4 damage and disturbance caused thereby would reach
5 intolerable levels; are you saying that that is neces-
6 sarily so, or are you saying that there is no evidence
7 sufficient to establish whether it is so or whether it
8 is not so?

9 A Yes, Mr. Commissioner,
10 I am trying to contradict the commonly expressed view
11 that the addition of a second utility in such a corri-
12 dor adds some miniscule addition to the total impact.
13 I believe, as I've explained, that the impact could
14 be quite substantial and the total impact of two or
15 more facilities might be completely destructive. The
16 chances of that are just -- or are better than the
17 chances that the total impact is a minute addition to
18 the impact of the first utility.

19 Q Yes, and you're saying
20 that's a consideration to be borne in mind when looking
21 at any proposal to bring a second pipeline down the
22 Alaska utility corridor beside the hot oil pipeline
23 they're building now?

24 A I would enlarge it
25 even to say that the consideration in connection with
26 building a pipeline beside a highway.

27 Q So that it would apply
28 to the continuation of the Fairbanks line from Fair-
29 banks south-east along the route of the Alaska Highway?

30 A Yes sir.

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Q That's a matter that Dr.

McTaggart-Cowan raised in June when he spoke to this Commission when he gave evidence, in connection with the prime route that Arctic Gas proposes to follow across the Northern Yukon along the Arctic coastal strip of the Northern Yukon, and he warned, as I recollect his evidence, that simply because you might be able to -- this is something which remains to be determined -- build a gas pipeline along the Arctic coastal strip of the Yukon, that doesn't mean that you could then build a second gas pipeline or some other transportation mode, and he described it - he raised the point you've raised, and he described it as destruction by insignificant increments. That's a subject that I think we might want to pursue tomorrow, but since the witness and I have used up most of your time tonight --

MR. ANTHONY: Well, Mr. Commissioner, I was merely going to say that in view of his departure into Scotland when I'll be dealing with this in detail in the corridor phase, I thought I'd do my part in having his evidence in chief presented and we can go into cross-examination perhaps tomorrow.

MR. GIBBS: You succeeded in that regard.

THE COMMISSIONER: Well, I think that it's going to be a long day, so we'll -- and a long evening, perhaps, so we'll adjourn the formal hearing until ten o'clock tomorrow morning and the Inquiry will re-convene at eight o'clock this evening

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1
2 here in the Sandman Inn to hold a community hearing of
3 the people of Whitehorse.

4 (PROCEEDINGS ADJOURNED TO AUGUST 12, 1975)
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